AKAI professional

DR4vr
HARD DISK RECORDER

Operator's Manual

AKAI DR4vr

Hard Disk Recorder

Owner's Manual

(Software Version 4.0)

WARNING

Power requirements for electrical equipment vary from area to area. Please ensure that your DR4vr meets the power requirements in your area. If in doubt, consult a qualified electrician or Akai Professional dealer.

120VAC   @ 60Hz for USA and Canada
220-230VAC   @ 50Hz for Europe (excluding UK)
240VAC   @ 50Hz for UK and Australia

PROTECTING YOURSELF AND THE DR4vr

*   Never touch the AC plug with wet hands.

*   Always disconnect the DR4vr from the power supply by pulling on the plug, not the cord.

*   Allow only an Akai Professional dealer or qualified professional engineer to repair or reassemble the DR4vr. Apart from voiding the warranty, unauthorized engineers might touch live internal parts and receive a serious electric shock.

*   Do not put, or allow anyone to put any object, especially metal objects, into the DR4vr.

*   Use only a household AC power supply. Never use a DC power supply.

*   If water or any other liquid is spilled into or onto the DR4vr, disconnect the power, and call your dealer.

*   Make sure that the unit is well-ventilated, and away from direct sunlight.

*   To avoid damage to internal circuitry, as well as the external finish, keep the DR4vr away from sources of direct heat (stoves, radiators, etc.).

*   Avoid using aerosol insecticides, etc. near the DR4vr. They may damage the surface, and may ignite.

*   Do not use denatured alcohol, thinner or similar chemicals to clean the DR4vr. They will damage the finish.

*   Modification of this equipment is dangerous, and can result in the functions of the DR4vr being impaired. Never attempt to modify the equipment in any way.

*   In order to assure optimum performance of your DR4vr, select the setup location carefully, and make sure the equipment is used properly. Avoid setting up the DR4vr in the following locations:
  1. In a humid or dusty environment
  2. In a room with poor ventilation
  3. On a surface which is not horizontal
  4. Inside a vehicle such as a car, where it will be subject to vibration
  5. In an extremely hot or cold environment

Precautions When Using the Optional Internal HD540 Hard Disk Drive

1. The hard disk drive has extremely high precision and is vulnerable to shock and vibration. If transporting the DR4vr by either land or air, we recommend packing it in a shell-shaped case lined with urethane rubber which meets ATA specifications.

2. Make sure the DR4vr is used in the horizontal position. Do not set it on end or tilt it when using it.

3. If the DR4vr is moved from a cold location to a warm one, or if the temperature has been raised suddenly, condensation may form inside the DR4vr. If it is impossible to avoid conditions like these, let the DR4vr sit for at least an hour in the new location before using it.

4. When setting up the DR4vr, make sure the ventilation opening is not blocked. Also, if using the DR4vr in a rack that contains other equipment, make sure sufficient ventilation space is assured on all sides (approx. 44 mm of space between the DR4vr and any equipment mounted above or below it in the rack).

WARNING

THIS APPARATUS MUST BE EARTHED

IMPORTANT

This equipment is fitted with an approved non-rewireable UK mains plug.

To change the fuse in this type of plug proceed as follows:

1) Remove the fuse cover and old fuse.

2) Fit a new fuse which should be a BS1362 5 Amp A.S.T.A or BSI approved type.

3) Refit the fuse cover.

If the AC mains plug fitted to the lead supplied with this equipment is not suitable for your type of AC outlet sockets, it should be changed to an AC mains lead, complete with moulded plug, to the appropriate type. If this is not possible, the plug should be cut off and a correct one fitted to suit the AC outlet. This should be fused at 5 Amps.

If a plug without a fuse is used, the fuse at the distribution board should NOT BE GREATER than 5 Amp.

PLEASE NOTE: THE SEVERED PLUG MUST BE DESTROYED TO AVOID A POS-SIBLE SHOCK HAZARD SHOULD IT BE INSERTED INTO A 13 AMP SOCKET ELSEWHERE.

The wires in this mains lead are coloured in accordance with the following code:

GREEN and **YELLOW**	— EARTH
BLUE	— NEUTRAL
BROWN	— LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, please proceed as follows:

The wire which is coloured GREEN and YELLOW must be connected to the terminal which is marked with the letter E or with the safety earth symbol $\perp$ or coloured GREEN or coloured GREEN and YELLOW.

The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK.

The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

THIS APPARATUS MUST BE EARTHED

Ensure that all the terminals are securely tightened and no loose strands of wire exist.

Before replacing the plug cover, make certain the cord grip is clamped over the outer sheath of the lead and not simply over the wires.

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COPYRIGHT NOTICE

WARRANTY

AKAI Electric Co. Ltd warrants its products, when purchased from an authorized AKAI dealer, to be free from defects in materials and workmanship for a period of 12 (twelve) months from the date of purchase. Warranty service is effective and available to the original purchaser only, and only on completion and return of the AKAI Warranty Registration Card within 14 days of purchase.

Warranty coverage is valid for factory-authorized updates to AKAI instruments and their software, when their installation is performed by an authorized AKAI Service Centre, and a properly completed Warranty Registration has been returned to your Akai Professional dealer.

To obtain service under this warranty, the product must, on discovery of the defect, be properly packed and shipped to the nearest AKAI Service Centre. The party requesting warranty service must provide proof of original ownership and date of purchase of the product.

If the warranty is valid, AKAI will, without charge for parts or labour, either repair or replace the defective part(s). Without a valid warranty, the entire cost of the repair (parts and labour) is the responsibility of the product's owner.

AKAI warrants that it will make all necessary adjustments, repairs and replacements at no cost to the original owner within 12 (twelve) months of the purchase date if:

1   The product fails to perform its specified functions due to failure of one or more of its components.

2   The product fails to perform its specified functions due to defects in workmanship.

3   The product has been maintained and operated by the owner in strict accordance with the written instructions for proper maintenance and use as specified in this Operator's Manual.

Before purchase and use, owners should determine the suitability of the product for their intended use, and the owner assumes all risk and liability whatsoever in connection therewith. AKAI shall not be liable for any injury, loss or damage, direct or consequential, arising out of the use, or inability to use the product.

The warranty provides only those benefits specified, and does not cover defects or repairs needed as a result of acts beyond the control of AKAI, including, but not limited to:

1   Damage caused by abuse, accident or negligence. AKAI will not cover under warranty any original factory disk damaged or destroyed as a result of the owner's mishandling.

2   Damage caused by any tampering, alteration or modification of the product: operating software, mechanical or electronic components.

3   Damage caused by failure to maintain and operate the product in strict accordance with the written instructions for proper maintenance and use as specified in this Operator's Manual.

4   Damage caused by repairs or attempted repairs by unauthorized persons.

5   Damage caused by fire, smoke, falling objects, water or other liquids, or natural events such as rain, floods, earthquakes, lightning, tornadoes, storms, etc.

6   Damage caused by operation on improper voltages.

IMPORTANT NOTE: This warranty becomes void if the product or its software is electronically modified, altered or tampered with in any way.

AKAI shall not be liable for costs involved in packing or preparing the product for shipping, with regard to time, labour or materials, shipping or freight costs, or time and expenses involved in transporting the product to and from an AKAI Authorized Service Centre or Authorized Dealer.

AKAI will not cover under warranty an apparent malfunction that is determined to be user error, or the owner's inability to use the product.

THE DURATION OF ANY OTHER WARRANTIES, WHETHER IMPLIED OR EXPRESS, INCLUDING BUT NOT LIMITED TO THE IMPLIED CONDITION OF MERCHANTABILITY, IS LIMITED TO THE DURATION OF THE EXPRESS WARRANTY HEREIN.

AKAI hereby excludes incidental or consequential damages, including but not limited to:

1   Loss of time

2   Inconvenience

3   Delay in performance of the Warranty

4   The loss of use of the product

5   Commercial loss

6   Breach of any express or implied warranty, including the Implied Warranty of Merchantability, applicable to this product

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Introduction

From all at Akai, thank you for purchasing an Akai DR4vr Hard Disk Recorder, and welcome to the exciting world of hard disk recording. Reading through this manual will provide you with a good understanding of what the DR4vr is all about.

What is the DR4vr?

If you think of a conventional four-track recorder, replace all the analog circuitry with the latest digital audio processing technology, replace the tape transport with a hard disk for near-instant digital audio data access, you won't be far off the DR4vr concept.

However, the DR4vr also features a remarkable technological breakthrough called "virtual tracks" that greatly expands the capabilities of the recorder far beyond those of a conventional four-track. This innovation enables you to record and playback digital-quality sound on any four channels you select from a possible 250 virtual tracks, greatly expanding your recording, ping-pong recording, and mixdown capabilities. (See "Virtual Tracks" on page 27.)

The DR4vr uses hard disks as its recording media. You can extend the available recording time according to your budget by adding external hard disks or using a larger internal hard disk. In addition, the DR4vr provides nonlinear audio playback, and you can specify edit points and search and locate with frame accuracy.

The DR4vr is not supplied as standard with an internal hard disk drive. Use Akai's optional HD540 540MB internal hard disk, or consult your Akai professional dealer for details about other DR4vr compatible hard disk drives.

Features

* 4-channel, 250-virtual track hard disk recorder.
* 16-bit linear PCM recording.
* 17 channel minutes per 100MB of hard disk (fs @ 48 kHz).
* Up to four units can be connected for a 16 channel system.
* Up to seven SCSI hard disks can be connected.
* 18-bit 64-times oversampling A/D converters.
* 18-bit 8-times oversampling D/A converters.
* Near-instant data access, no time consuming rewinds, etc.
* Instant playback start.
* Repeat playback with no gaps.
* Powerful stereo Ping-pong mode.
* 8 direct locate points. 100 stack locate points.
* Absolute and relative time modes, with sync offset.
* Beat/tempo map for MIDI Clock master operation.
* Adjustable preroll.
* Varipitch.
* Punch in/out includes: manual, auto (with rehearsal), and footswitch.
* Jog/shuttle wheel for locating edits.
* Edit functions include: copy, copy+insert, move, move+insert, erase, delete, insert, and edit undo.
* Balanced 1/4 inch phone jack analog inputs and outputs (+4 dBu or –10 dBV).
* XLR and RCA/phono digital inputs and outputs (AES/EBU or S/PDIF).

- Backup to DAT via digital I/O
- Remote connection for multiple DR4vrs/DR4ds synchronization.
- Remote control from the Akai DL4.
- Optional HD540 540MB and larger hard disks can be installed.
- Optional IB-110D Digital Interface allows four channel playback & recording via digital I/O.
- Optional IB-111S Interface for connecting MO drives, personal computers, etc.
- Optional IB-112T SMPTE/EBU Timecode Interface for SMPTE/EBU timecode synchronization.
- Optional IB-113M MIDI Interface for MIDI sequencer synchronization.

Inside the DR4vr

Options

IB-113M MIDI Interface

IB-112T SMPTE Interface

IB-111S SCSI-B Interface

Analog input

Digital I/O-A

Digital audio
data processor

Analog output

Digital I/O-B

IB-110D
Option

Optional
HD540
Hard disk

ZERO
RETURN

PLAY
TO OUT

SCSI-A

Remote

Hard disk

DR4vr

Hard disk

DR4vr

Hard disk

DR4vr

Recording media

Synchronization to other DR4vrs
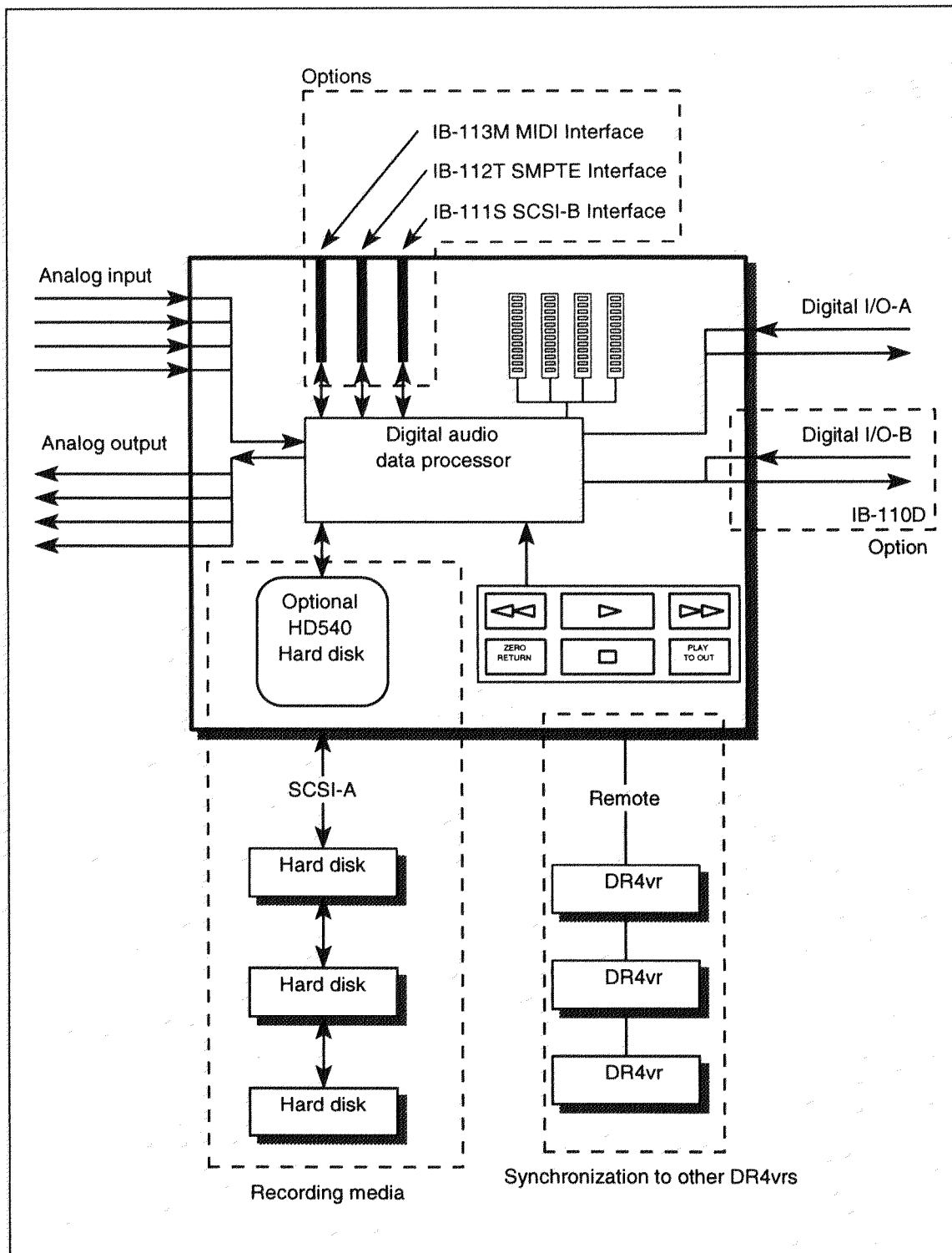
1 Front & Rear Panels

Front Panel
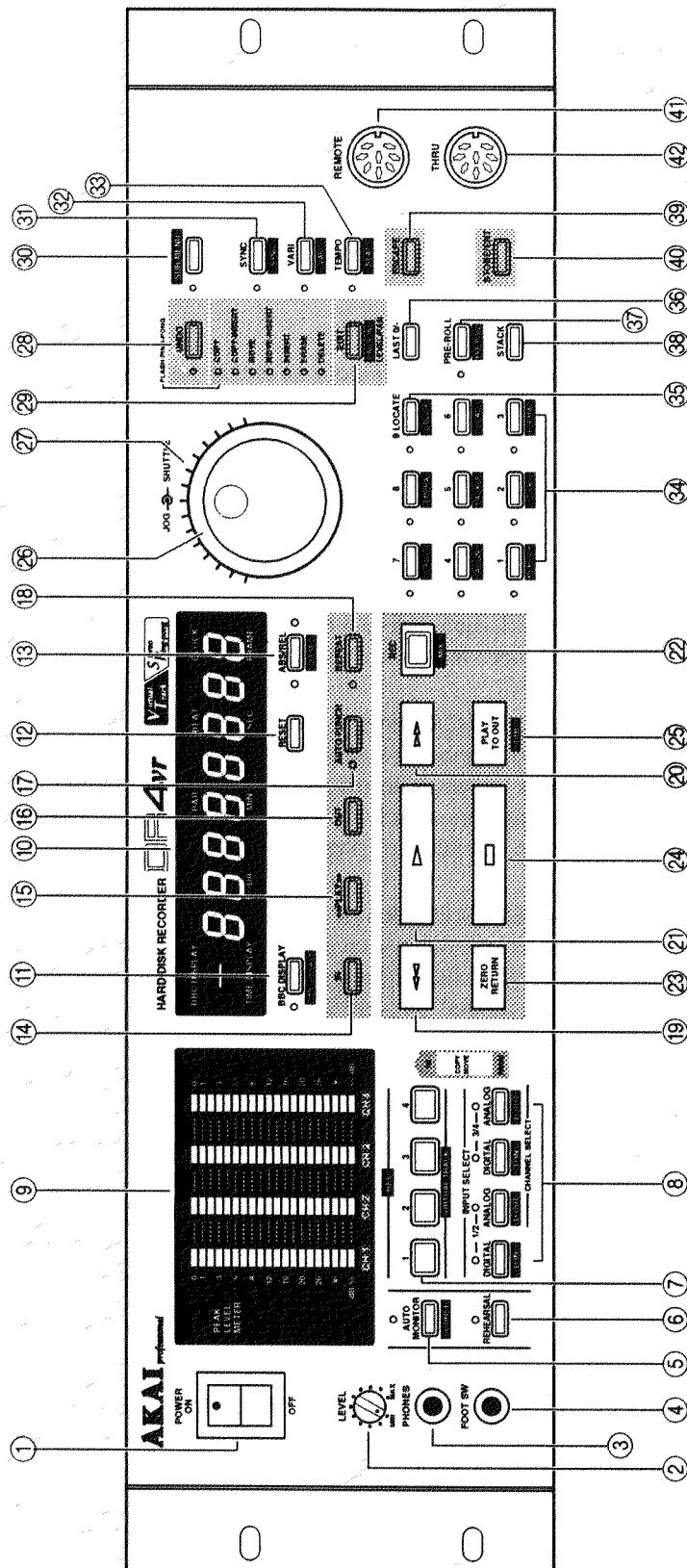
1) POWER switch

This is the power switch. The rocker part of this switch is recessed in the ON position to prevent accidental power off.

2) PHONES LEVEL

This control adjusts the headphone volume level.

3) PHONES connection

A stereo pair of headphones can be connected to this 1/4 inch stereo phone jack. Channels 1 and 3 are on the left, channels 2 and 4 are on the right.

4) FOOT SW connection

A normally closed type footswitch can be connected here for punch in/out operation. See "Footswitch Punch In/Out" on page 31.

5) AUTO MONITOR/SOURCE key

This switch turns the auto monitor on and off. In the on position, monitoring is automatically switched between playback and source when recording. The off position allows you to monitor the source during playback too. This is useful for practising with existing tracks before recording. See "Auto Monitor" on page 33 and "Muting the source sound (AUTO MONITOR)" on page 46.

6) REHEARSAL key

This key turns the rehearsal function on and off. Rehearsal allows you to rehearse punch ins and outs. During a rehearsal, the monitor will switch to source at the punch in point, but nothing will be recorded. See "Rehearsal" on page 33.

7) Channel REC/VIRTUAL TRACK keys 1 ~ 4

These keys are used to arm channels for recording. A flashing key indicates that a channel is armed for recording, and a lit key indicates recording in progress. In the sub-menu, you can select virtual tracks in combination with the jog wheel. See "Arming Channels" and "How to Assign a Virtual Track to a Channel" on page 27.

8) INPUT SELECT/CHANNEL SELECT keys 1/2, 3/4

These keys are used to select the input source, analog or digital, for each pair of channels. LED indicators show the currently selected source. See "Selecting the Analog Inputs" on page 24 and "Selecting the Digital Inputs" on page 26.

In the sub-menu, these keys are used to select the type 1 and type 2 digital signal formats for the digital inputs and outputs. See "Selecting the Digital Input Connection Type" on page 25 and "Setting the Digital Output Format" on page 26.

In Ping-pong mode, these keys allow you to select channels for mix ratio/PAN settings.

9) PEAK LEVEL METER

These 20-segment LED bargraphs with peak hold indicate the playback and source signal levels. They also indicate MIX ratio or PAN settings in Ping-pong mode. (See "Ping-pong mode" on page 41.)

10) DISPLAY

These eight 7-segment LED digits display disk time, either absolute or relative. They are also used for entering and displaying locate points. In BBC mode, they indicate bar, beat, and clock. sub-menu settings and error messages are also displayed.

The small dot at the bottom right of each digit also has a special function:

The left-most dot indicates that the hard disk is being accessed.

The second dot indicates the disk access condition. Under normal operation it will flash. If data access activity is excessive, it will be lit constantly. In this case, use the align function. See "Data Alignment" on page 76.

The four dots from the right, 1, 2, 3, 4 from left to right, indicate that data exists on a channel at the current position. If this dot is lit but nothing is output during playback, this indicates a recorded blank area. Although blank areas do not contain any data, they do use hard disk space, so it's best to erase them in order to free up the space.

This display also shows the held peak level, MIX ratio, and PAN settings in Ping-pong mode. (See "Ping-pong mode" on page 41.)

11) BBC DISPLAY key

This key switches the display to BBC mode: Bar, Beat, and Clock. This mode is mainly used when the DR4vr is working as a MIDI Clock master with the optional IB-113M MIDI Interface. See "MIDI Synchronization" on page 85.

12) RESET key

This key is used to reset the relative time to zero. If it is pressed while an absolute time is displayed, relative time will be selected automatically, just like pressing the ABS/REL key.

13) ABS/REL key

This key switches the display between absolute time and relative time. Absolute time starts at zero, cannot be changed, and works as the base time for relative time. When synchronizing via SMPTE or MIDI, the relative mode can be used to set synchronization offsets.

14) IN key

This key is used to set and locate the in point. The in point is the point at which repeat playback starts and auto punch in occurs. It is also used to specify the beginning of a section when editing.

15) <<PLAY>> key

This key is used to play back the section between the in point and out point.

16) OUT key

This key is used to set and locate the out point. The out point is the point at which repeat playback ends and auto punch out occurs. It is also used to set the end of a section when editing.

17) AUTO PUNCH key

This key switches the DR4vr to auto punch in/out mode. In this mode, punch in will occur automatically when the in point is reached. Likewise, punch out will occur automatically when the out point is reached.

18) REPEAT key

This key is used to switch on repeat mode. In this mode, playback will be repeated between the in point and out point. This is similar to the repeat function found on many tape based recorders. However, with the DR4vr there is no rewind time between out point and in point — repeated playback cycles round like a continuous loop.

19) Rewind key

This key is like the rewind key found on most conventional tape recorders. In stop mode, it activates time display fast rewind. In play mode, it activates playback review.

20) Fast Forward key

This key is like the fast forward key found on most conventional tape recorders. In stop mode, it activates time display fast forward. In play mode, it activates playback preview.

21) Play key

This key is used to start playback. Pressing this key while holding down the REC/MIX key will start recording.

22) REC/MIX key

This key (in combination with the play key) is used to start recording. It lights up while recording is in progress.

In sub-menu mode, press this key to perform mixdown.

23) ZERO RETURN key

In absolute mode, this key will locate to the absolute 00:00:00:00 point. In relative mode, it will locate to the relative 00:00:00:00 point.

24) Stop key

This key is used to stop playback, recording, fast forward, and rewind.

25) PLAY TO OUT key

This key will start playback at a specified number of seconds before the current position, i.e., the currently displayed time. Playback will stop when that current position is reached. This is useful for confirming edit points. The number of seconds can be specified in the TIME sub-menu.

26) JOG wheel

The jog wheel allows you to locate while listening to a recording. Playback speed is determined by how fast you turn the wheel. Turn it counterclockwise to review and clockwise to preview.

This wheel is also used to set parameter values. Turn it counterclockwise to decrease values and clockwise to increase them.

27) SHUTTLE control

Like the JOG wheel, the shuttle control also allows you to locate while listening to a recording. The playback speed can be 1/4, 1/2, x2, x4 normal speed, and is determined by the angle at which you hold the control. Turn it counterclockwise to review and clockwise to preview.

This control is also used to set parameter values in single steps. Turn it counterclockwise to decrement a value one step, and clockwise to increment one step.

28) UNDO key

This key allows you to undo the last recording or edit. This is useful if you make a mistake while recording and want to return to the previous recording. Likewise, when editing you can compare the material before and after an edit. See "Recording Undo" on page 34 and "Undoing an Edit" on page 60.

29) EDIT/PING-PONG LEVEL/PAN key

This key is used to select the edit functions. See "Editing" on page 59.

In sub-menu mode, it is used to show the current mode. In Stereo Ping-pong mode, this key is used to toggle between MIX ratio and PAN.

30) SUB-MENU key

This key is used to select sub-menu functions. To select a sub-menu function, press this key,

then press the corresponding sub-menu key. The names of the sub-menu functions appear underneath certain keys in dark boxes.

31) SYNC key

This key is used to activate synchronization with an external device. Up to four DR4vrs can be synchronized using Akai AL-X50 Remote Cables. An optional IB-113M MIDI Interface or IB-112T SMPTE reader/gernerator is required for MIDI and SMPTE synchronized operation.

32) VARI key

This key switches on the varipitch function for playback. The amount of varipitch is set using the VARI sub-menu function. See "Varipitch" on page 39.

33) TEMPO key

This key is used when creating a tempo map. Tempo maps are used when the DR4vr is used as a MIDI Clock master with the optional IB-113M MIDI Interface. See "MIDI Clock Synchronization" on page 86.

In the sub-menu, it is used for creating a beat map. See "Creating a Beat Map" on page 90.

34) Keypad 1 ~ 8

These keys are used to store and recall the eight direct locate points, enter time values, and set parameter values.

In sub-menu mode, these keys perform various functions.

35) LOCATE 9/UTILITY key

This key is used to enter locate time values. See "Locating to a Specific Point" on page 51. It is also used for entering time values and setting parameter values.

In sub-menu mode, this key is used to select a tempo map, clear tracks or ping-pong parameter settings, and to adjust the overall level.

36) LAST 0/-

This key is used to locate to the last two points at which the stop key was pressed. Press the key once to locate to the last point at which the stop key was pressed. Press again to locate to the last but one point. See "Last Memory" on page 54.

This key is also used for entering time and parameter values, and entering negative values.

37) PREROLL key

This key is used to switch on the preroll function. Preroll refers to a specified number of seconds before the specified locate point. For example, if the preroll value is set to 5, the DR4vr will locate to a point 5 seconds before the specified locate time. The preroll value is set using the PREROLL sub-menu function. See "Preroll" on page 54.

38) STACK key

This key is used to enter and recall the 100 stack locate points. See "Stack Locate Points" on page 53.

39) ESCAPE key

This key can be used to escape from the current edit or sub-menu function. It can also be used to escape from incorrectly entered time values, to abort the disk formatting and alignment operations.

40) STORE/ENT key

This key is used when entering and storing time values, executing edit functions, etc.

41) REMOTE connection

This connection is used for connecting the optional DL4 Remote Controller and synchronizing other DR4vrs.

42) THRU connection

This connection is used for synchronizing other DR4vrs.

Note: Use only Akai AL-X50 cables for REMOTE and THRU connections.

Rear Panel
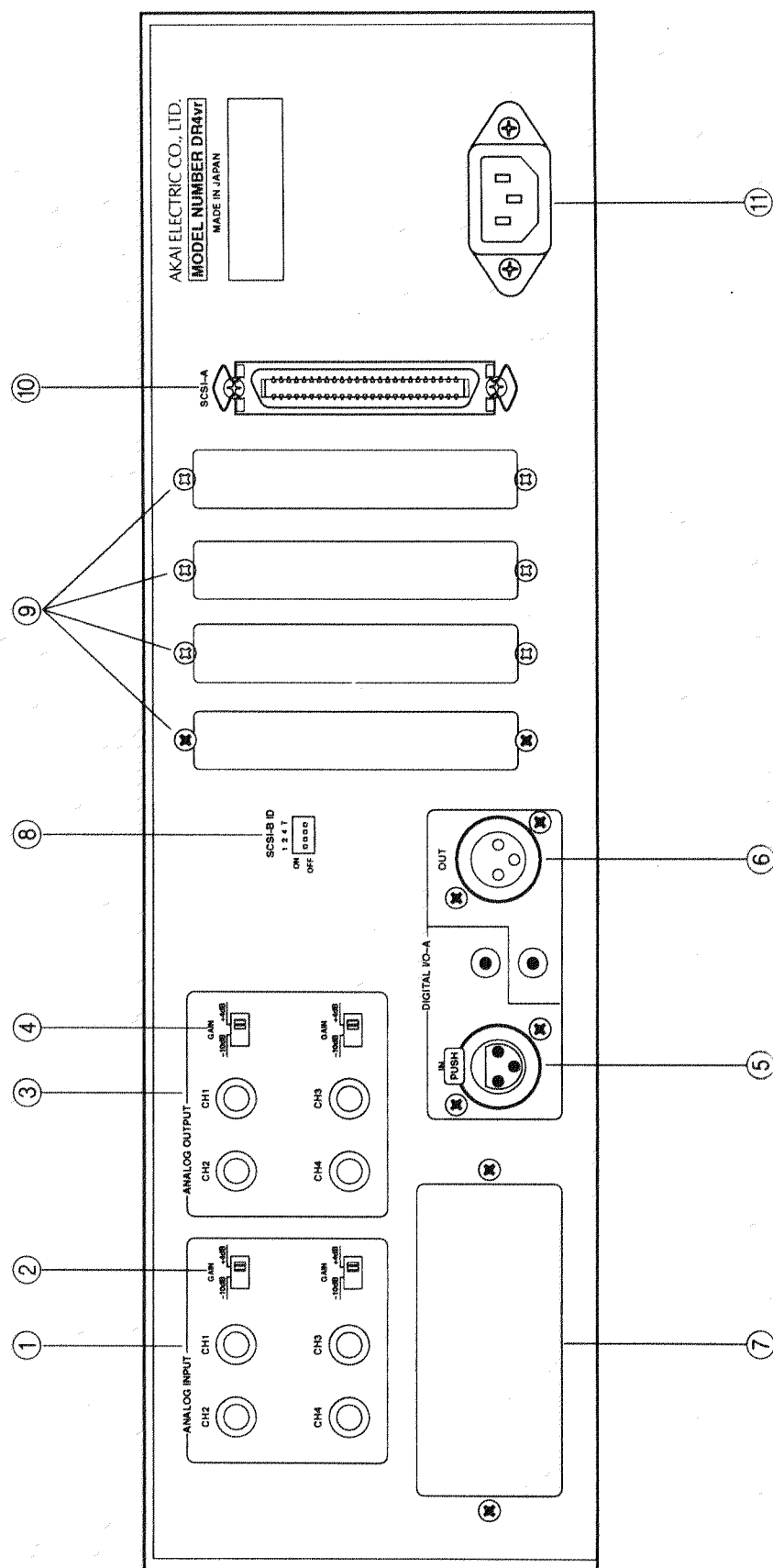
1) ANALOG INPUT

These 1/4 inch stereo phone jacks are used to input analog signals to the DR4vr. They accept balanced and unbalanced signals: Tip = hot, ring = cold, sleeve = ground.

2) Input GAIN switch

These switches allow you to set the DR4vr input gain. They can be set to −10 dB or +4 dB. Input gain switches are provided for channels 1/2 and channels 3/4.

3) ANALOG OUTPUT

These 1/4 inch stereo phone jacks are used to output analog signals from the DR4vr. They can be used balanced or unbalanced: Tip = hot, ring = cold, sleeve = ground.

4) Output GAIN switch

These switches allow you to set the DR4vr output gain. They can be set to −10 dB or +4 dB. Output gain switches are provided for channels 1/2 and channels 3/4.

The actual output gain depends whether you use the outputs balanced or unbalanced. The following table shows the actual gain for each possible setting:

Connection Type	Switch Setting	
	−10 dBV	+4 dBu
Balanced	−4 dBV	+4 dBu
Unbalanced	−10 dBV	−2 dBu

0 dBu = 0.775 Vrms, 0dBV = 1 Vrms

5) DIGITAL I/O-A IN

These XLR and RCA/phono connectors are used to input AES/EBU and S/PDIF format digital signals respectively. The active input is selected using the D IN sub-menu function. See "Selecting the Digital Input Connection Type" on page 25.

Without the optional IB-110D Digital Interface, the left channel digital signal is fed to channels 1 and 3. Similarly, the right channel digital signal is fed to channels 2 and 4. For this reason, it is not possible to record more than two channels simultaneously via the digital inputs. If you do need to record three or four channels simultaneously via the digital inputs, use the optional interface.

6) DIGITAL I/O-A OUT

These XLR and RCA/phono connectors are used to output AES/EBU and S/PDIF format digital signals. The format of the digital output signal is set using the D OUT sub-menu function. See "Selecting the Digital Input Connection Type" on page 25.

Without the optional IB-110D Digital Interface, only channel signals 1 and 2 can be output digitally. If you need to output three or four channels simultaneously via the digital outputs, use the optional interface.

You can backup all four channels to a DAT recorder via digital outputs 1 and 2 even without the optional IB-110D Digital Interface.

7) DIGITAL I/O-B option slot

An optional IB-110D Digital Interface can be installed into this slot. This interface allows digital signals for channels 3 and 4 to be input and output independently of the DIGITAL I/O-A connections.

8) SCSI-B ID

This DIP switch is for use with the optional IB-111S SCSI interface. It is used to set the DR4vr's SCSI ID and termination for SCSI-B bus. This bus is for backing up to an MO disk and connecting to personal computers. This switch has no effect on SCSI-A bus.

9) Option slots

These option slots are for installing the following interface cards: IB-112T SMPTE reader/generator IB-113M MIDI Interface, and IB-111S SCSI-B Interface.

10) SCSI-A connection

For increased recording time, up to six external SCSI hard disks can be connected to this connection (up to seven with no internal hard disk). See "Hard Disks" on page 69.

11) Power inlet

Connect the supplied power cable to this connection. Connect the other end of the power cable to an appropriate AC receptacle.

2 Getting Around the DR4vr

The DR4vr is relatively easy to operate, and anyone who has used a conventional tape recorder will find it quite straightforward.

Sub Menus

Many of the DR4vr keys provide two functions: a main function and a *sub-menu* function. The main function of these keys is printed above it and the sub-menu function is printed below it, enclosed in a dark box. Some sub-menu keys provide access to functions, some to variable parameters.

To access a sub-menu function, first press the SUB-MENU key, then while its indicator is flashing, press the respective key.

Setting Parameters

Most parameters can be set using the jog wheel, shuttle control, or number keypad. However, this does vary from function to function, so refer to the operating procedure for each function.

Entering Time Values

To locate to any point, or to set the in point, out point, direct locate point, stack locate point, etc., you must display the desired time on the display. The desired time can be entered as follows:

1) **Press the LOCATE key.**
   - - - - - - - will appear on the display.

2) **Use the number keypad to enter the desired time.**
   Time values should be entered from left to right. For example, to enter the time 15 minutes 32 seconds 20 frames, press these number keys in the following order: 1, 5, 3, 2, 2, 0.

   If you make a mistake while entering the time, press the RESET key, then reenter the time.

3) **Press the STORE/ENT key.**
   The DR4vr will display the specified time. Note that the DR4vr will actually locate to the specified time. If you want to return to the previous point, press the LAST key.

   Of course, you can also use the rewind, fast forward, play, and stop keys, or jog wheel and shuttle control to display a time on the display.

Specifying the In Point & Out Point

The in point and out point values are used for auto punch in/out recording and editing. To set an in point or out point:

1) Display the desired time on the display.

2) Press the STORE/ENT key.
The display and indicators for number keys 1 to 8 will flash.

3) Press the IN key or OUT key as required.
The point will be stored.

In Point & Out Point Notes

The smallest interval allowed between the in point and the out point is 1024 samples. The following list shows how this translates approximately into time for each sampling frequency:

Fs @ 48 kHz = 21 msec

Fs @ 44.1 kHz = 23 msec

Fs @ 32 kHz = 32 msec

Escape

If while setting a parameter or using a function you want to cancel it, press the ESCAPE key to return to the previous state.

You can also press this key if you wish to cancel track assignment.

Furthermore, use this key to abort the disk formatting operation and disk alignment operation.

3 Setting Up the DR4vr

Siting the DR4vr

The DR4vr should be sited on a strong, level surface, with plenty of room for ventilation. If you rack mount the DR4vr, leave at least 1U of free space above and below it. Hard disk drives do not like being used at non right angles, so keep the DR4vr level.

Connecting the Power

> **Warning:** *Before connecting DR4vr to an AC receptacle, make sure that the mains voltage in your area matches that printed on the DR4vr rear panel.*

Connect the supplied power cable to the power inlet on the rear panel of the DR4vr. Connect the other end of the power cable to an appropriate AC receptacle.

Power On/Off

To power on the DR4vr, push the POWER switch to its ON position. The DR4vr takes about 10 seconds to warm up before it can be used. During this time it checks the status of any disk drives, and its version number is shown on the display. Once the DR4vr is ready for use, the time value 00:00:00:00 will appear.

Before powering off the DR4vr, make sure that no functions are currently in progress. Powering off while recording or backing up may destroy some data.

To power off the DR4vr, push the POWER switch to its OFF position.

The internal disk drive will automatically park its heads for protection in transit.

Typical DR4vr Setup

The following diagram shows the DR4vr in a typical recording setup:
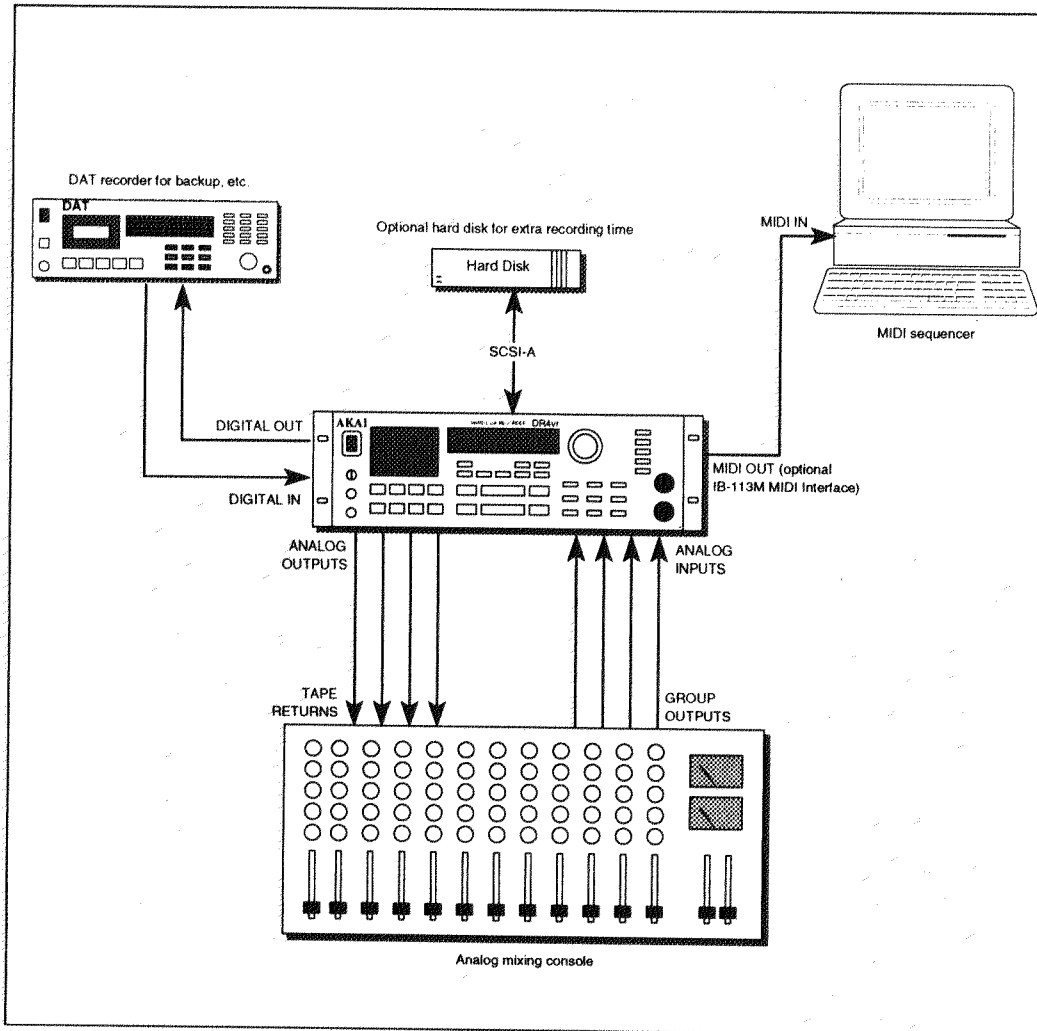
4 Recording

In this chapter, we explain how to record using the DR4vr. You can use up to 250 virtual tracks to assign to Channels 1-4 for recording. This virtual track capability allows you to use the same channel again, while leaving the existing data as is. (See "Virtual Tracks" on page 27.) Your DR4vr should already have an optional hard disk installed, so you have everything you need. However, the hard disk must be formatted before use. See "Formatting New Disks" on page 74.

Analog Recording Setup

To record via the analog inputs, you must select the analog inputs, then set the sampling frequency.

Sampling Frequency

It is important that you set the sampling frequency before recording. If it is changed after some material has been recorded, that material will playback at the wrong pitch.

The DR4vr can record at any one of the three common digital audio sampling frequencies: 32 kHz, 44.1 kHz, and 48 kHz. The deciding factors in your choice of sampling frequency are: application, required audio bandwidth, and available hard disk space. Some information about sampling frequency, applications, and audio bandwidth are provided below. See also "Hard Disk Size" on page 70.

If you intend to backup to DAT, refer to your DAT's operating manual to see which sampling frequencies it can record at via its digital inputs.

48 kHz

This frequency is supported by most professional digital audio equipment and provides an audio bandwidth of about 22 kHz. Consumer type DAT and DCC recorders typically record at this frequency when their analog inputs are used. Use this frequency if you want the highest audio bandwidth. Although, bear in mind that an expensive sampling frequency conversion will be required before your material can be transferred to CD.

44.1 kHz

This frequency is supported by most professional digital audio equipment and provides an audio bandwidth of about 20 kHz. Prerecorded CDs, DCC tapes, and MDs use this frequency. Professional recording studios that utilize digital equipment typically use it. If your DR4vr material is destined for distribution on CD, then it's best to use this frequency.

32 kHz

This frequency is widely used for digital broadcast applications where a 15 kHz audio bandwidth, about that of FM radio, is deemed acceptable. It is also used for some DSB (Digital Satellite Broadcasting) applications. It offers the lowest audio bandwidth, but the maximum recording time. It maybe useful for projects where recording time takes precedence over audio bandwidth.

Setting the Sampling Frequency

1) Press the SUB-MENU key.
Its indicator will flash.

2) Press the FS key.
Its indicator will light up, and the current sampling frequency setting will appear on the display.

3) Use the jog wheel or shuttle control to select a sampling frequency.
The following sampling frequencies are available:

Sampling Frequency	Display
32 kHz	FS - 32
44.1 kHz	FS - 44.1
48 kHz	FS - 48

4) Press the STORE/ENT key.
The new sampling frequency will be selected.

Selecting the Analog Inputs

Source inputs are switched in pairs: 1/2 and 3/4. So, for example, you cannot set input 1 to digital and input 2 to analog simultaneously.

The analog inputs are initially selected when the DR4vr is powered on. The four indicators above the INPUT SELECT keys show the current settings for inputs 1/2 and 3/4.

The analog inputs use 1/4 inch stereo phone jacks. They accept balanced and unbalanced signals: Tip = hot, ring = cold, sleeve = ground.

Setting the Input Gain Switch

The gain of the analog inputs is switched in pairs (1/2, 3/4), and can be set to –10 dB or +4 dB.

Set the gain switches to match the level of the incoming signal.

The DR4vr does not have any recording level controls. So the signal level must be set on the device that is feeding the DR4vr inputs. See "Setting Levels" on page 29.

Digital Recording Setup

To record via the digital inputs, you must set the sampling frequency, select the type of digital input, then select the digital inputs.

Sampling Frequency

To record via the digital inputs, the DR4vr must be set to the same sampling frequency as that used by the incoming digital signal. This is because the DR4vr has to synchronize with the incoming signal. If you are recording from a CD, prerecorded DCC, or MD, this will be 44.1 kHz. If you are recording from a DAT or DCC that was recorded via analog inputs, this will be 48 kHz.

If the sampling frequency of the incoming digital signal and the DR4vr are not the same, the message *FSooPS* will appear on the display. In this case, set the DR4vr sampling frequency to match that of the incoming digital signal. If you have already recorded some material, then input a digital signal and this message appeared, your existing material will not playback correctly even if you change the DR4vr sampling frequency.

> *Note: You can record while the FSooPS message is displayed. However, since the DR4vr time display corresponds to the sampling frequency set on the DR4vr, the displayed time will not correspond with the actual time.*

To set the sampling frequency, see "Setting the Sampling Frequency" on page 24.

Selecting the Digital Input Connection Type

Digital signals can be input using either XLR or RCA/phono type connections.

1) **Press the SUB-MENU key.**
   Its indicator will flash.

2) **Press the D IN key for channels 1/2 or 3/4.**
   The currently selected digital input will appear on the display.

3) **Use the jog wheel or shuttle control to specify an input.**

Input Connection	Display
XLR	*HLr*
RCA/phono	*rCA*

4) **Press the STORE/ENT key.**
   The specified input will be selected.

Selecting the Digital Inputs

Source inputs are switched in pairs: 1/2 and 3/4. So, for example, you cannot set input 1 to digital and input 2 to analog simultaneously.

Without an optional IB-110D Digital Interface card installed, channels 1/2 will also be set to digital inputs when channels 3/4 are selected for digital input. Therefore, you cannot record an analog signal via inputs 1/2 and a digital signal via inputs 3/4 simultaneously. Furthermore, channels 3/4 are fed the same signals as those for channels 1/2 via digital inputs 1/2 (I/O-A). In this case, you can use the Channel REC/VIRTUAL TRACK keys to decide which channels record the signals. If all channels are armed for recording, the same signal will be recorded on channels 1 and 3; likewise for channels 2 and 4.

With the optional card installed, you can record any number of channels simultaneously, each with individual digital inputs and outputs. In this case, channels 1/2 are handled via DIGITAL I/O-A, and channels 3/4 via DIGITAL I/O-B. However, to record three or four channels simultaneously, both digital inputs must be connected to the same digital audio device, or each device must be wordclock synced. This is because the data received at both digital inputs must be synchronized. If it isn't, noise may be produced.

1) Connect the digital signal to the selected digital input connection.
See "Selecting the Digital Input Connection Type" on page 25.

2) Press the INPUT SELECT DIGITAL key for inputs 1/2 or 3/4.
The DR4vr will synchronize to the incoming digital signal.

If the DR4vr cannot synchronize to the incoming digital signal, the message *no dI G IA* will appear on the display. This message means, no digital input signal at I/O-A. If the same problem occurs with I/O-B, the message *no dI G Ib* will appear on the display. In either case, the DR4vr will not work correctly, so check the digital connections on the DR4vr and the device sending the digital signal.

Setting the Digital Output Format

Channel signals are output digitally via XLR and RCA/phono type connectors. The format of the digital output signal can be set to either Type 1 or Type 2. Type 1 is sometimes referred to as AES/EBU Professional, and Type 2 as S/PDIF Consumer.

Digital outputs are switched in pairs: channels 1/2 and channels 3/4. So, for example, you cannot set channel 1 to Type 1 and channel 2 to Type 2 simultaneously.

Without the optional IB-110D Digital Interface, only channel signals 1/2 can be output digitally. If you need to output three or four channels simultaneously via the digital outputs, use the optional interface.

To set the digital output format:

1) Press the SUB-MENU key.
Its indicator will flash.

2) Press the D OUT key for channels 1/2 or 3/4.
The currently set output format will appear on the display.

3) Use the jog wheel or shuttle control to specify a format.

Format	Display
Type 1 (AES/EBU Professional)	*tYPE 1*
Type 2 (S/PDIF Consumer)	*tYPE2*

4) Press the STORE/ENT key.
The specified format will be selected.

Virtual Tracks

The DR4vr features an innovation called "virtual tracks" that enables you to record and play back digital-quality sound on any four tracks that you select from a possible 250 "virtual" tracks.

The virtual track innovation enables you to work with a vastly greater number of tracks, thereby removing the most troubling limitation of conventional 4-track recording.

Virtual tracks enable you to do the following:

* You can play a guitar phrase and record it on Track 10, then play it again and record it on Track 11. You can then use the COPY function in EDIT mode to copy the better of the two phrases to Track 20--without any generational loss in quality, of course!

* You can store unedited recordings on virtual tracks.

* You can use virtual tracks to record sounds that you plan to use early in the mixdown process.

* Virtual tracks that do not contain sound will not use hard disk space. (Of course, if you attempt to record silence, the recording will require hard disk space.)

* Virtual tracks greatly enhance your ability to ping-pong tracks (see "Ping-pong mode" on page 41).

The diagram on the next page illustrates the concept of virtual tracks.

How to Assign a Virtual Track to a Channel

You can assign tracks to a maximum of four channels. By default, virtual tracks 1, 2, 3, and 4 are assigned to channels 1, 2, 3, and 4.

1) Press the SUB-MENU key, then select a channel by pressing the corresponding Channel REC/VIRTUAL TRACK 1/2/3/4 key.

2) Use the jog wheel to select a track, then press the STORE/ENT key.
You can select from 250 "virtual tracks."

Notes on Virtual Track Assignment

* You cannot assign the same track to two channels. If you try to do so, the screen will show *HIt CH3*, indicating the number of the channel to which the same track number has been set.

* After you use the FORMAT or ERASE function for the hard disk, Tracks 1-4 will be assigned to Channels 1-4 respectively.

* Be aware that any sound data left in virtual tracks uses hard disk space.

* If you have not executed the Ping-pong function for the channel after editing the parameters in Ping-pong mode, those edits will become ineffective when you select a new track for that channel. In this case, the screen will show *C*. If you want to continue assigning tracks, press the STORE/ENT key. Pressing the ESCAPE key will stop the procedure.
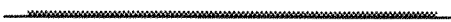
Arming Channels

To arm channels ready for recording:

1) Press the respective Channel REC/VIRTUAL TRACK keys.
The Channel REC/VIRTUAL TRACK keys of the armed channels will flash.

Virtual Track Example

❑ For example, assign tracks 1, 2, and 4 to virtual tracks 10, 20, and 40 and record drums, bass, and vocals.

Track	Virtual Track		
REC ▶ 1	(10)	Drum	
REC ▶ 2	(20)	Bass	
3	30	Guitar	
REC ▶ 4	(40)	Vocal	

❑ Record a guitar solo on track 3.

Track	Virtual Track		
1	10	Drum	
2	20	Bass	
REC ▶ 3	(30)	Guitar	
4	40	Vocal	

❑ Assign track 3 to virtual track 31 and record another version of the guitar solo.

Track	Virtual Track		
1	10	Drum	
2	20	Bass	
REC ▶ 3	(31)	Guitar	
4	40	Vocal	

❑ Assign track 3 to virtual track 32. Record a different guitar part on virtual track 32.

Track	Virtual Track		
1	10	Drum	
2	20	Bass	
REC ▶ 3	(32)	Guitar	
4	40	Vocal	

❑ Assign track 4 to virtual track 31 to prepare for some editing.

Track	Virtual Track		
1	10	Drum	
2	20	Bass	
3	32	Guitar	
4	(31)	Guitar	

❑ Copy part of virtual track 31 to virtual track 32.

Track	Virtual Track		
1	10	Drum	
2	20	Bass	
COPY 3	(32)	Guitar	
4	(31)	Guitar	

❑ If you need part of virtual track 30, assign track 4 to virtual track 30.

Track	Virtual Track		
1	10	Drum	
2	20	Bass	
3	32	Guitar	
4	(30)	Guitar	

❑ Copy the desired part of virtual track 30 to virtual track 32.

Track	Virtual Track		
1	10	Drum	
2	20	Bass	
COPY 3	(32)	Guitar	
4	(30)	Guitar	

❑ Finally, return and assign track 4 to virtual track 40.

Track	Virtual Track		
1	10	Drum	
2	20	Bass	
3	32	Guitar	
4	(40)	Vocal	

Setting Levels

Like most multitrack recorders, the DR4vr does not have any recording level controls. So the signal level must be set on the device that is feeding the DR4vr inputs. Typically, the group output master faders on a mixing console are used for this.

Set the signal level so that the loudest peaks reach the 3 to 5 dB level on the DR4vr bargraphs. If the red 0 dB LED lights up, the level is definitely too high. Digital recorders, unlike their analog tape counterparts, produce unpleasant signal distortion when maximum levels are exceeded. So take care—any signal distortion will be recorded to disk. When recording vocals and acoustic instruments, which are prone to sudden level changes, a signal compressor can be used to keep signal levels under control.

If you are recording from a digital source, you probably won't be able to adjust the signal level. However, some digital audio equipment, including Akai's DD1500, does allow some degree of digital level control.

Starting & Stopping Recording

To start recording:

1) **Press and hold down the REC/MIX key, then press the play key.**
The REC/MIX key and the Channel REC/VIRTUAL TRACK keys of any armed tracks will light up, indicating that recording is in progress.

2) **Press the stop key to stop recording.**

Manual Punch In/Out

Manual punch in/out allows you to punch in and punch out once during playback.

1) Set up the DR4vr so that it is ready to record.
Record setup procedures are explained on the preceding pages.

2) Arm the channel that you want to use for punch in/out.
The Channel REC/VIRTUAL TRACK key of the armed channel will flash.

3) Rewind to a position before the point at which you want to punch in.

4) Press the play key to start playback.

5) When the desired punch in point is reached, press and hold down the play key, then press the REC MIX key.
Punch in will occur as soon as the REC/MIX key is pressed.

6) Press the play key again to punch out.
The following diagram shows the procedure for manual punch in/out:

```
 ┌─────────────────────────────────────────────────────────────┐
 │                                                               │
 │      ╱─────────────╱▓▓▓▓▓▓▓▓▓▓▓▓▓╱──────────────╱            │
 │     ╱  Playback   ╱  Recording  ╱   Playback   ╱             │
 │                        |              |                       │
 │                  Punch in:      Punch out:                    │
 │                  Press PLAY &   Press PLAY key                │
 │                  REC keys                                     │
 │                                                               │
 │         ───────────────────── Time ──────────────────▶       │
 │                                                               │
 └─────────────────────────────────────────────────────────────┘
```
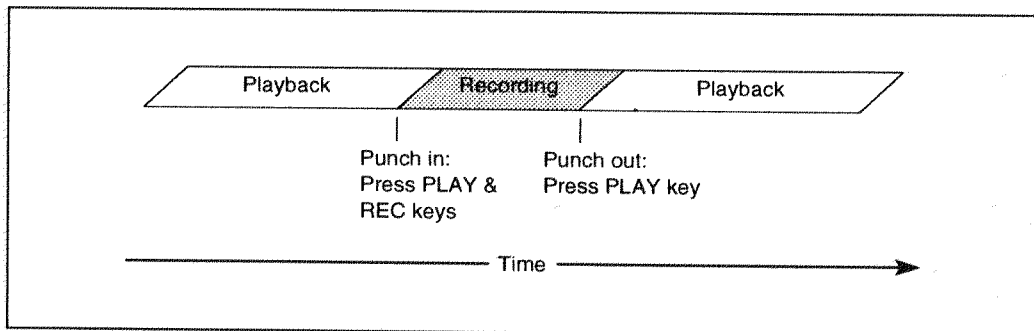
Manual Punch In/Out Notes

When a manual punch out is performed with the auto monitor function set to on, the monitor output will be interrupted momentarily as the monitor switches from source to playback. The recorded material is not affected by this.

There is a limit to the smallest interval allowed between the in point and the out point. See "Specifying the In Point & Out Point" on page 20.

When you punch in and punch out, the in point and out point values are updated automatically. If you are trying a difficult punch in/out, perform the manual punch in/out with the rehearsal function on, then confirm the punch in/out points using the auto punch in/out function. If they are OK, switch off the rehearsal function, then perform an auto punch in/out.

Manual punch in/out operations cannot be performed repeatedly during playback. Once you have punched out, you cannot punch in again without first stopping, then restarting playback.

Footswitch Punch In/Out

Manual punch in/out can also be carried out using a footswitch, especially useful if you are playing an instrument and operating the DR4vr simultaneously.

1) **Connect a footswitch to the FOOT SW connection on the front panel.**

2) **Set up the DR4vr so that it is ready to record.**
Record setup procedures are explained in the preceding pages.

3) **Arm the channel that you want to use for punch in/out.**
The Channel REC/VIRTUAL TRACK key of the armed channel will flash.

4) **Rewind to a position before the point at which you want to punch in.**

5) **Press the play key to start playback.**

6) **When the desired punch in point is reached, press the footswitch.**
Punch in will occur as soon as you press the footswitch.

7) **Press the footswitch again to punch out.**

> *Note: Pressing the footswitch again will not punch in, it will stop playback. You cannot punch in/out continuously during playback. To punch in again, stop, then restart playback.*

8) **Press again to stop playback.**
The following diagram shows the procedure for footswitch punch in/out:
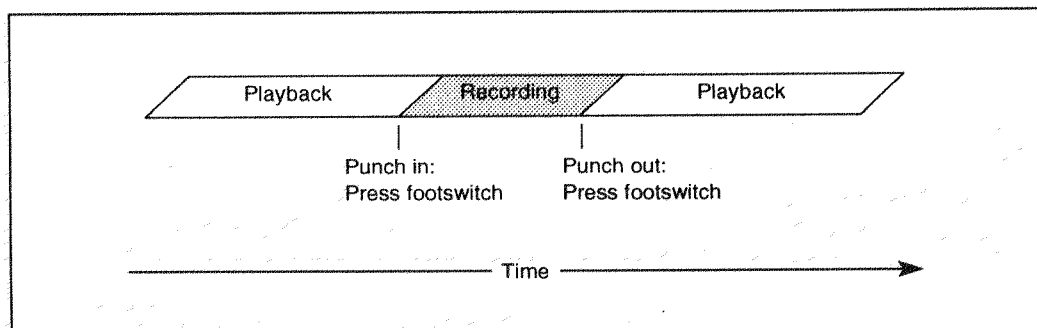
Auto Punch In/Out

Auto punch in/out allows you to automatically punch in and punch out at the specified in and out points. This is useful when you need greater accuracy than that possible using manual punch in/out. It also allows you to repeat a punch in/out until you are happy with the result.

1) **Set up the DR4vr so that it is ready to record.**
    Record setup procedures are explained on the preceding pages.

2) **Arm the channel that you want to use for punch in/out.**
    The Channel REC/VIRTUAL TRACK key of an armed channel will flash.

3) **To set the in point, display the desired time on the display, press the STORE/ENT key, then press the IN POINT key.**
    See "Specifying the In Point & Out Point" on page 20.

4) **To set the out point, display the desired time on the display, press the STORE/ENT key, then press the OUT POINT key.**
    See "Specifying the In Point & Out Point" on page 20.

5) **Press the AUTO PUNCH key.**
    Its indicator will light up.

6) **Rewind to a position before the specified in point.**

7) **Press the play key to start playback.**

8) **When the specified in point is reached, punch in will occur automatically.**
    The REC/MIX key and the Channel REC/VIRTUAL TRACK keys of any armed tracks will light up, indicating that recording is in progress.

9) **When the specified out point is reached, punch out will occur automatically, and playback will continue.**

10) **Press the stop key to stop playback.**
    The following diagram shows the procedure for auto punch in/out:
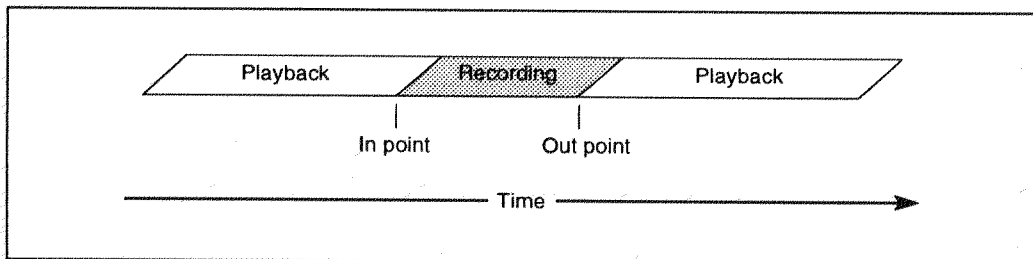
Auto Punch In/Out Notes

The auto punch in/out function is switched off automatically after it has been used.

Make sure that you start playback from a point before the specified in point. Otherwise, auto punch in/out cannot be performed.

Auto Monitor

The auto monitor function provides automatic monitor signal switching for playback and recording. For convenient monitoring, this can be set to ON. However, if you want to monitor a source signal during playback, for example, to practice while listening to other channels before recording, it must be switched off.

The following table shows auto monitor operation under various conditions:

Auto Monitor	Channel REC/ VIRTUAL TRACK key	Stop	Playback	Recording
ON	ON (channel armed)	Source	Playback	Source (recording)
	OFF	No Output	Playback	Playback
OFF	ON (channel armed)	Source	Source	Source (recording)
	OFF	No Output	Playback	Playback

Rehearsal

The rehearsal function allows you to practice a recording before actually recording anything to disk. This is useful when used with automatic punch in/out for checking punch in/out points.

With the REHEARSAL function on, you start recording as normal. When the specified in point is reached, the monitor signal is switched. However, nothing is actually recorded to disk. When the specified out point is reached, the monitor signal is switched again.

To record for real, switch off the REHEARSAL function, then start recording as normal.

Recording Undo

If you record some new material over some existing material, and then decide that you preferred the original, this undo function can be used to restore the original. In fact, you can switch between the original and the new during playback for comparison. This is possible because the DR4vr always records new material on a different area of the hard disk.

Operation

After each recording, the DR4vr will play the new material. To play the original material, press the UNDO key. The UNDO indicator will light up. Press again to switch back to the new material. The UNDO indicator will go off.

Before starting another recording or performing an edit, you must decide which material you want to keep: the original or the new. (Of course, if you wish to defer this decision, you can always simply select a new virtual track. See "Virtual Tracks" on page 27.) For once a new recording or edit function is performed, the undo function will apply to that new recording or edit.

Once you've decided, leave the UNDO function set as required, then make a new recording or use an edit function. If you don't record anything new or make any edits, you will be able to undo the last recording even after the DR4vr has been powered off and on.

The following diagram shows how the recording undo function works:
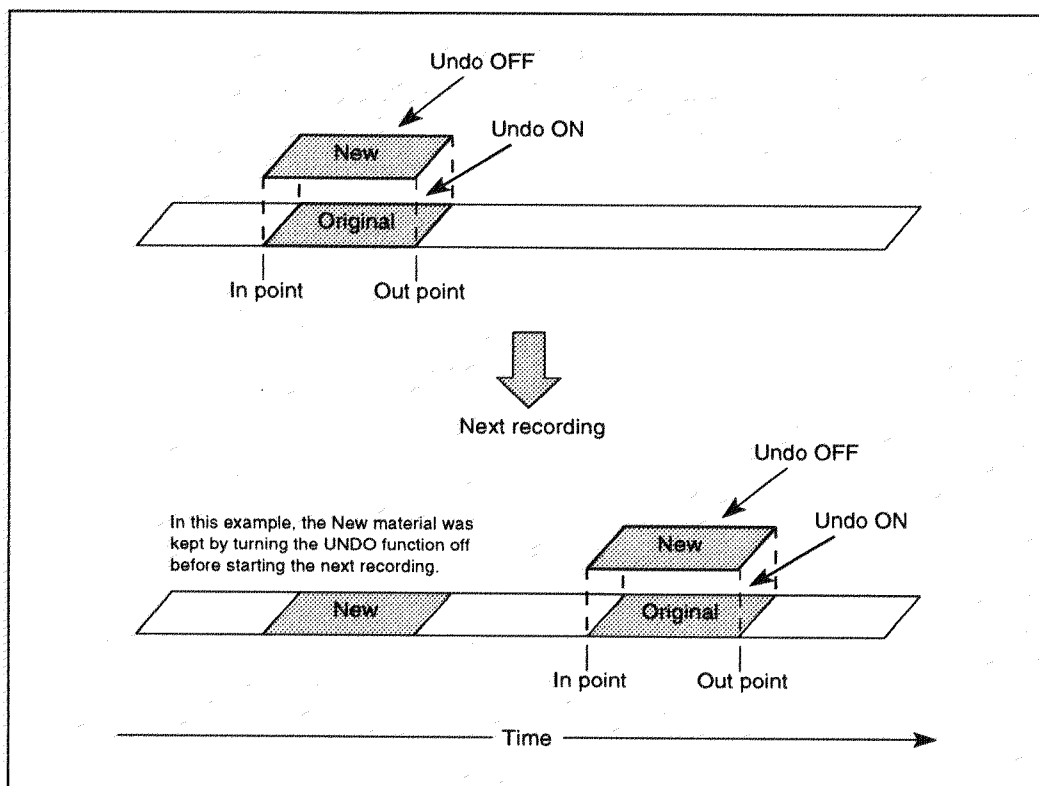
Recording and Limited Disk Space

In the following example, 11 out of 16 minutes have been recorded, and a new recording made on the original 11 minute section. After 5 minutes the new recording stopped because all the hard disk space had been used up. The message REC STOP appeared on the display. However, the MEMORY sub-menu function still indicates 5 minutes available for recording. This is because the new 5 minute section will actually replace part of the original 11 minute section, depending whether you choose to keep the new (undo off) or original (undo on). Either way, you'll still be able to record for another 5 minutes.
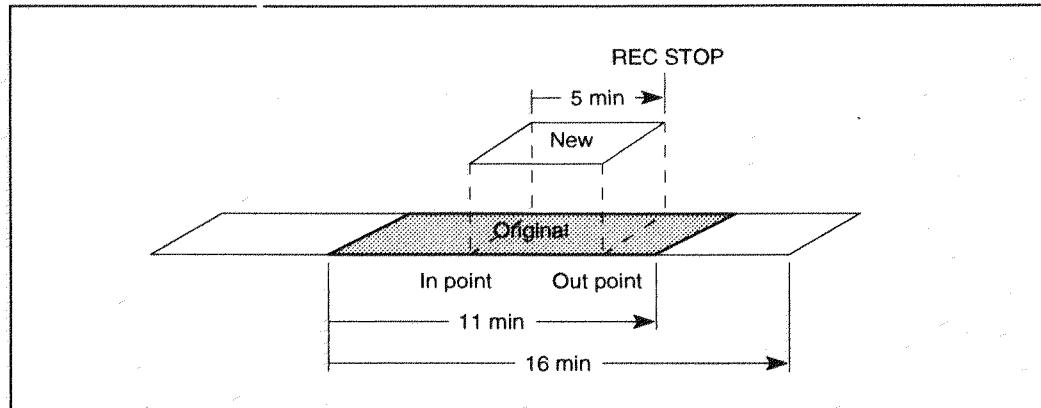
Available Recording Time Display

To check the available recording time:

1) Press the SUB-MENU key.
Its indicator will flash.

2) Press the MEMORY key.
With all the Channel REC/VIRTUAL TRACK keys set to off, the total amount of recording time available will be displayed.

As each Channel REC/VIRTUAL TRACK key is pressed, the amount of recording time available to each armed channel will be displayed.

5 Playback

In this chapter, we explain some functions that apply to playback only.

Starting & Stopping

Press the play key to start playback, and the stop key to stop it.

Play to Out

The play to out function starts playback at a specified number of seconds before the current position, i.e., the currently displayed time. Playback will stop when that current position is reached. This is useful for confirming edit points.

This function can also be used to return to the previous position after playback. For example, if you want to play the material that occurs after the current position, press the play key, then press the PLAY TO OUT key. The DR4vr will stop playback and return to the previous position. If you press the stop key instead, the previous position will be lost, and the point at which you press the stop key will become the current position.

Setting the Play to Out time

1) Press the SUB-MENU key.
Its indicator will flash.

2) Press the PLAY TO OUT key.
The play to out time will appear on the display.

3) Use the jog wheel, shuttle control, or number keypad to specify a time.
The play to out time can be set from 1 to 99 seconds.

4) Press the STORE/ENT key.
The specified time will be entered.

Operation

1) Press the PLAY TO OUT key.
Playback will start the specified number of seconds before the current position, continue up to that current position, and then stop.

The following diagram shows how the play to out function works:
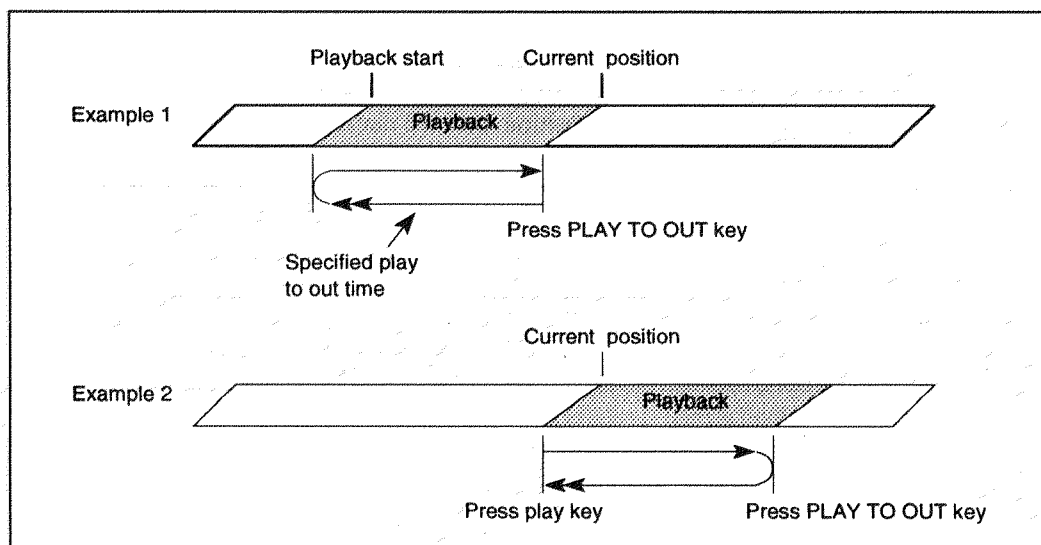
Repeat

The repeat function allows you to repeatedly play the material that occurs between the in point and out point. Unlike the repeat function found on tape based recorders, the DR4vr does not have to rewind when the out point is reached. So repeat playback is continuous. You can even use it to experiment with, for example, drum loops. In fact, by using the repeat function to perfect loop points, and the edit functions to copy, etc., you could create a complete drum track using just the DR4vr.

Operation

1) To set the in point, display the desired time on the display, press the STORE/ENT key, then press the IN POINT key.
See "Specifying the In Point & Out Point" on page 20.

2) To set the out point, display the desired time on the display, press the STORE/ENT key, then press the OUT POINT key.
See "Specifying the In Point & Out Point" on page 20.

3) Press the REPEAT key.
Its indicator will light up.

4) Press the play key to start repeat playback.
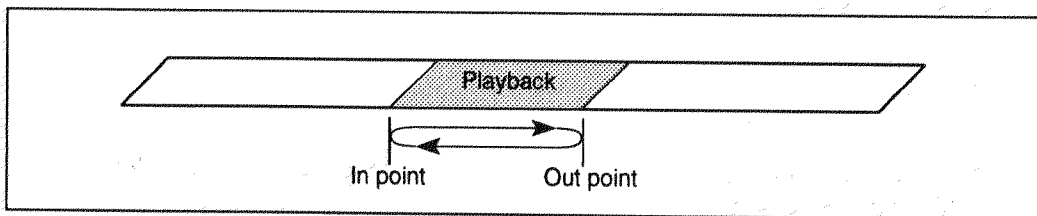
Repeat Playback Notes

If you start repeat playback at a position before the in point, or at a position between the in point and out point, playback will start from the current position, proceed up to the out point, then start repeating.
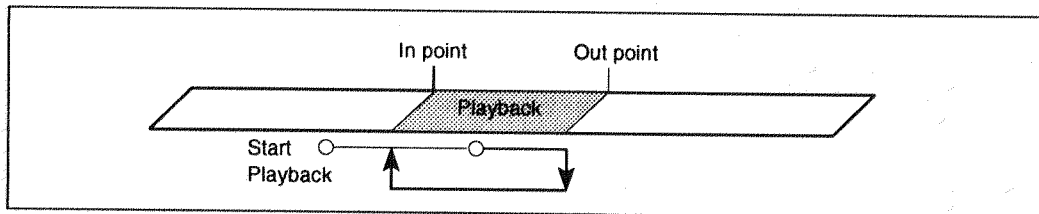
If you start repeat playback at a position after the out point, playback will start immediately from the in point.
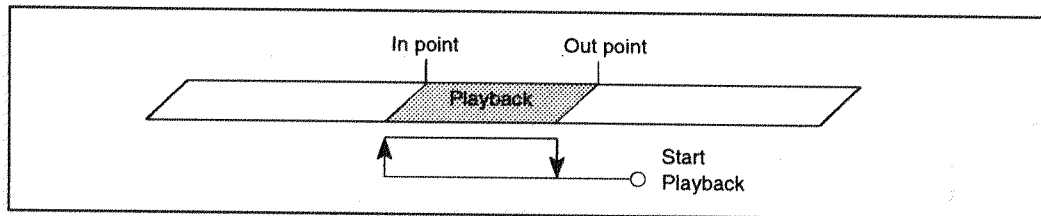
Varipitch

The varipitch function allows you to vary the pitch of recorded material during playback. The amount of varipitch available depends on the selected sampling frequency. There are 64 varipitch steps between sampling frequencies 32 kHz and 48 kHz.

Sampling Frequency	Varipitch Step Range	Varipitch Range
48 kHz	−64 ~ 0	−33.33% ~ 0
44.1 kHz	−53 ~ −1 / +1 ~ +12	−27.44% ~ −0.49% / +0.23% ~ +8.84%
32 kHz	0 ~ +64	0 ~ +50%

As you can see, the pitch can be increased and decreased at 44.1 kHz. However, at 32 kHz it can be increased only, and at 48 kHz, decreased only.

Setting the Amount of Varipitch

To set the amount of varipitch:

1) Press the SUB-MENU key.
Its indicator will flash.

2) Press the VARI key.
Unless a varipitch value has already been set, the lowest varipitch step will appear on the display:

Fs @ 48 kHz = -64
Fs @ 44.1 kHz = -53
Fs @ 32 kHz = 0

3) Use the jog wheel or shuttle control to specify the amount of varipitch.

4) Press the STORE/ENT key.
The specified value will be set.

Operation

To use varipitch:

1) Press the VARI key.
The VARI indicator will light up.

Recorded material will now playback with the specified amount of varipitch.

Press again to turn off varipitch.

Varipitch Notes

The amount of varipitch cannot be adjusted while playback is in progress.

Varipitch cannot be used when the digital inputs are being used.

6 Ping-pong mode

Ping-pong mode enables you to mixdown up to 250 virtual tracks to create finished stereo or monaural recordings. (See "Virtual Tracks" on page 27 for more information.)

Because you have numerous virtual tracks available, there is no need to overwrite tracks during mixdown; you can leave them as they are, and create numerous tracks from which to choose. You can mix any two or three tracks together in monaural ping-pong mode to build your mix. This greatly expands the creative potential of the mixdown process.

In addition to 250 virtual tracks, the DR4vr also features two stereo MIX tracks that you can use for recording and playback in ping-pong mode. (So, in total the DR4vr contains 252 tracks!) Once you enter Ping-pong mode, you can assign the tracks that are currently assigned to the MIX channels to other "virtual" tracks.

You can adjust the MIX ratio or PAN settings while listening to the playback. You can also edit the MIX ratio or PAN settings of a recording that has already been mixed down.

The DR4vr features two ping-pong modes: Monaural Ping-pong and Stereo Ping-pong.

> *Note: It is a good idea to mix down at a lower volume level first, then to adjust the overall level later as described on page 47. Be careful not to mix down at too high a volume or you will cause distortion (digital overflow).*

> *Note: During Remote Sync with a DL4 or multiple DR4vrs connected, follow the steps below, then perform Ping-pong mode settings.*
>
> *When a DL4 is connected: Select a DR4vr ID number using the DL4, and follow the steps below.*
>
> *During Remote Sync: All functions are controlled from the master device, except for selecting the virtual track and setting the MIX ratio and PAN, which must be controlled from each slave device.*

Setting Monaural Ping-pong mode

In Monaural Ping-pong mode, you adjust the MIX ratio and mix the sound to create a monaural recording.

The MIX track will be assigned to Channel 1. You can select from 250 virtual tracks to assign to Channels 2, 3, and 4.

1) **Press the SUB-MENU, then the EDIT key.**

2) **Use the jog wheel to select ◠◠◔◠◠ (MONO), then press the STORE/ENT key.**
   The COPY LED below the UNDO key will flash, indicating that the DR4vr is in Ping-pong mode.

   • In this mode, Channel 1 becomes a mixing track; you *cannot* assign it to a virtual track.

   • Channels 2, 3, and 4 become source channels; you *can* assign them to virtual tracks.

Setting Stereo Ping-pong mode

In Stereo Ping-pong mode, you can adjust the MIX ratio and PAN settings and mix the sound to create a stereo masterpiece.

MIX Tracks L and R will be assigned to Channels 1 and 2. You can select from 250 virtual tracks to assign to Channels 3 and 4.

Ping-pong Mode Example

❏ For example, enter stereo ping-pong mode:

Track	Virtual Track		
1	—	Mix L	
2	—	Mix R	
3			
4			

❏ Assign track 3 to Drum L and track 4 to Drum R.

Track	Virtual Track		
1	—	Mix L	
2	—	Mix R	
3	1	Drum L	
4	2	Drum R	

❏ Mix down, adding the drum sounds to the mix. At this time, you can set the level and pan.

Track	Virtual Track		
1	—	Mix L	
2	—	Mix R	
3	1	Drum L	
4	2	Drum R	

❏ Assign track 3 to Bass.

Track	Virtual Track		
1	—	Mix L	
2	—	Mix R	
3	10	Bass	
4			

❏ Mix down, adding the bass sounds to the mix track. At this time, you can set the level and pan.

Track	Virtual Track		
1	—	Mix L	
2	—	Mix R	
3	10	Bass	
4			

❏ Assign other tracks for mixdown.

Track	Virtual Track		
1	—	Mix L	
2	—	Mix R	
3	21	Guitar	
4	22	Guitar	

❏ Mix down.

Track	Virtual Track		
1	—	Mix L	
2	—	Mix R	
3	21	Guitar	
4	22	Guitar	

❏ If you want to change the level and pan of a track that has already been mixed . . . assign track 3 to Bass (again).

Track	Virtual Track		
1	—	Mix L	
2	—	Mix R	
3	10	Bass	
4			

❏ Change the level and pan. Here, the bass is panned fully to the left.

Track	Virtual Track		
1	—	Mix L	
2	—	Mix R	
3	10	Bass	
4			

1) **Press the SUB-MENU key, then the EDIT key.**

2) **Use the jog wheel to select $5tErEo$ (STEREO), and press the STORE/ENT key.**
   - The COPY LED below the UNDO key will flash, indicating that the DR4vr is in Ping-pong mode.
   - In this mode, Channels 1 and 2 become L and R mixing tracks respectively; you *cannot* assign them to virtual tracks.
   - Channels 3 and 4 become source channels; you *can* assign them to virtual tracks.

Selecting a virtual track

3) **Press the SUB-MENU key, then press the Channel REC/VIRTUAL TRACK key of the corresponding source channel (REC 2, 3, or 4 for manual Ping-pong mode, or REC 3 or 4 for stereo Ping-pong mode).**
   The number of the track assigned for the channel will be shown.

4) **Use the jog wheel to select a track, and press the STORE/ENT key.**
   You can also enter a three-digit number from the numeric keypad.

5) **Repeat steps 3 and 4 for the other channels.**

Setting the MIX ratio

6) **Press the ANALOG or DIGITAL key that is appropriate for the source channel.**
   The LED for the selected ANALOG or DIGITAL key will flash.

7) **Use the jog wheel to set the MIX ratio in the range of +12dB through -24dB, or to oFF.**
   Rotating the jog wheel to the right will increase the value, and rotating it to the left will decrease the value.

8) **Repeat steps 6 and 7 for the other channels.**
   - If you set the MIX ratio to any value other than Off, the corresponding channel's INPUT SELECT LED will light up.
   - If you set the MIX ratio to Off, the INPUT SELECT LED will be turned off, indicating that the channel is not in use.

> *Note: In Stereo Ping-pong mode, the level meter will indicate a level 3dB lower when the PAN is centered in order to make the output level consistent.*

Setting the PAN

You cannot set the PAN in Monaural Ping-pong mode.

9) **Press the EDIT key to display the PAN parameter.**
   Pressing the EDIT key again will take you back to the MIX ratio parameter.

10) **Press the ANALOG or DIGITAL key that is appropriate for the source channel.**
    The LED for the selected ANALOG or DIGITAL key will flash.

11) **Use the jog wheel to set the PAN in the range of L10.0 through R10.0.**
    Rotating it to the right will move the pan setting to the right, and rotating to the left will move the pan setting to the left.

12) **Repeat steps 10 and 11 for the other channels.**

About MIX RATIO and PAN indicators

The following paragraphs explain how to read the MIX RATIO and PAN indicators and display.

MIX RATIO

METER:

A total of 20 LEDs show the mix ratio in the range of +10dB ~ 0 ~ –10dB.The difference between two adjacent LEDs is 1dB.

When playback is stopped, the level meter indicates the MIX RATIO.

During playback, the LEDs of the mixdown channel indicate the mixed sound level. The LEDs of other channels indicate the MIX RATIO. (When the mixdown channel is selected to change the MIX RATIO, the LEDs indicate the MIX RATIO.)

red	0	10dB
	1	9dB
		8dB
	3	7dB
		6dB
yellow	5	5dB
		4dB
	8	3dB
		2dB
	12	1dB
		0dB
	16	–1dB
		–2dB
	20	–3dB
green		–4dB
	26	–5dB
		–6dB
	36	–7dB
		–8dB
–dB 55		–9dB

When all those LEDs light up in green, MIX RATIO is 0dB.

MIX RATIO
(No indication on the panel)
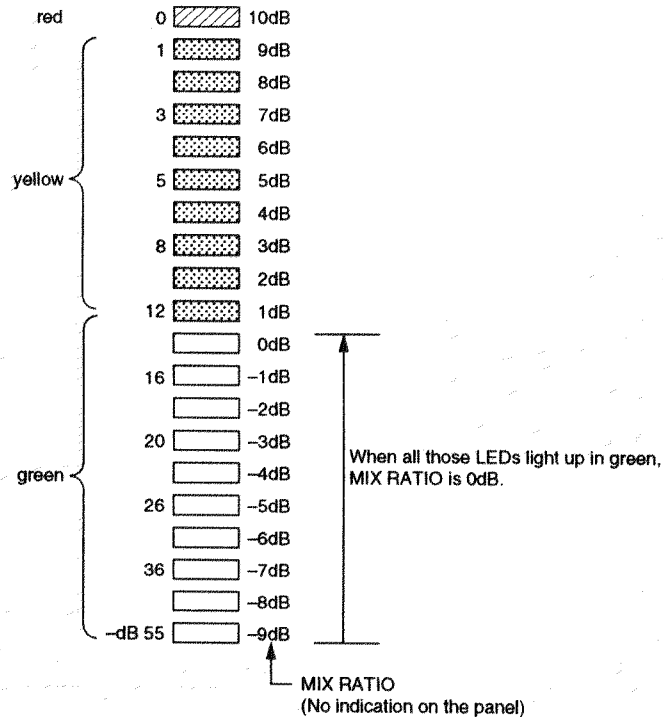
DISPLAY:

When playback is stopped, the display indicates the MIX RATIO.

Using the jog wheel will change the ratio in the range of +12dB ~ –24dB with a step of 0.2dB

```
CH2 -24.0
```

Mix source channel   The range of +12dB ~ –24dB
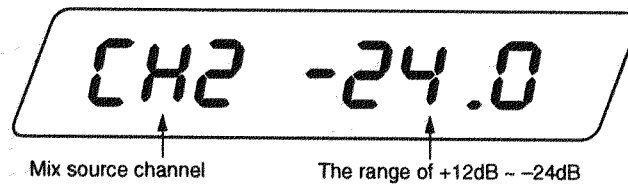
PAN

METER:

The PAN indication uses one or two LEDs. When the center PAN value is set, two LEDs in the center of the scale will light up. The difference between two adjacent LEDs is 1.0 step.

The lower LEDs are for the left settings, and the upper LEDs are for the right settings. (Refer to the figure on the next page.)
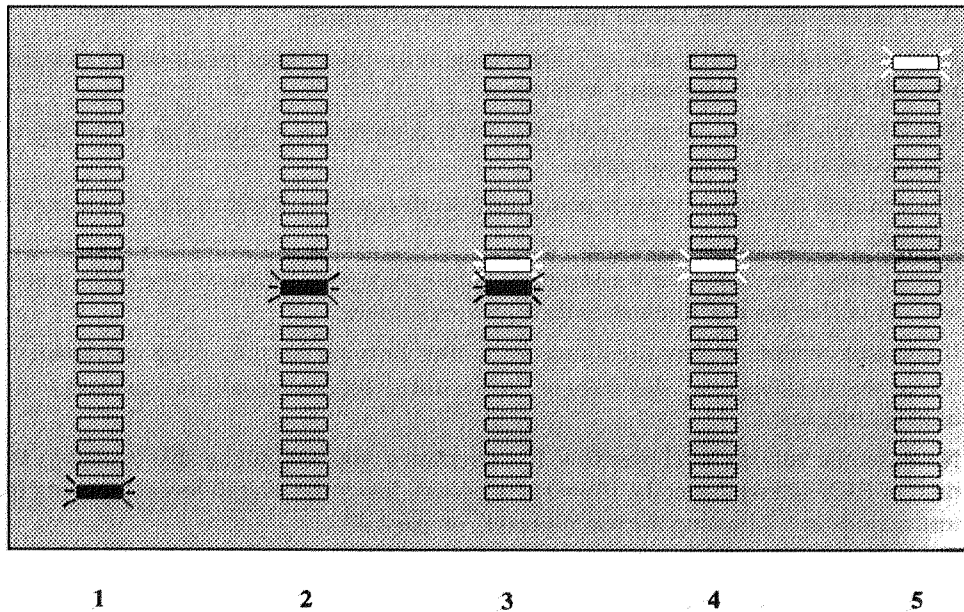
The scale (3) in the figure shows the center setting.

The scale (2) shows L00.1 - L01.0. The further left the pan, the lower the LEDs that will light, up to L09.1 - L10.0 as shown by Scale (1).

The scale (4) shows R00.1 - R01.0. The further right the pan, the higher the LEDs that will light, up to R09.1 - R10.0 as shown by Scale (5).

DISPLAY:

While in stop mode, the display indicates the PAN.

Using the jog wheel will change the panel setting in the range of L10.0~Center~R10.0 *L 10. 0 ~ CEnt ~r 10. 0* with a step of 0.1.

Playing back the mix sound

13) To check the mixed sound, first press the PLAY key, then use the jog wheel to adjust the MIX ratio and PAN settings of the mix source channels while listening to the sound.
In this case, the output sound will change dynamically.

* You can use normal playback (PLAY), playback between two points (<<PLAY>>), PLAY TO OUT, REPEAT, cue/review, FF/RWD, and various locate functions.

Mixdown

You can use the mixdown procedure to record the mixed sound from the source channels specified to the mix track. You can mix down the entire song only when the DR4vr is stopped.

> *Note: If you are using multiple DR4vrs in remote sync, use the master DR4vr to mix down.*

14) Press the SUB-MENU key, then the REC/MIX key.
The display will show *ALL PP* (All Ping-pong.)

15) Press the STORE/ENT key.
The display will show *SUrE PP* .

16) Press the STORE/ENT key again to start mix down.
The display will count down to *Ed 00000*, then show *FI nI SH*, and the mixdown is completed.

Notes on mix down

- After mixing down, the DR4vr remains in Ping-pong mode.

- You can change the MIX ratio or PAN setting of the tracks after mixdown by repeating the preceding procedure beginning with step 3.

- The DR4vr will carry out ping-pong mixdown using data recorded in up to 250 tracks; you cannot add an external input signal.

- You can redo the ping-pong mix using the UNDO function. Refer to the "Undo recording" section.

- If you change the virtual track assignment before ping-pong mixdown, the MIX ratio and PAN settings of that track will return to their previous status.

- If you edit, record, or clear the source track after carrying out ping-pong mixdown, you will not be able to change the MIX ratio or PAN setting later. Do not add any changes to the tracks used for mixdown.

- Never let the volume level overflow. If it overflows, you will not be able to change the MIX ratio or PAN setting correctly. If overflow occurs, lower the overall level following the instructions in "Adjusting the overall level" on page 47.

Mixing down a specified part

This function allows you to mix down only a specified part of a recording.

1) Mark the part to be mixed down using IN and OUT memory.
Refer to "Specifying the In Point & Out Point" on page 20 for information on using the IN and OUT memory.

> *Note: To check the length of the specified part, press the IN key and OUT key simultaneously. (This function does not work on the BBC screen.) You may check the IN and OUT points by listening to the sound using the PLAY TO OUT function.*

> *Note: Press the <<PLAY>> key to playback the specified part.*

2) Press the SUB-MENU key, then the REC/MIX key.

3) Use the jog wheel to select R_rER PP **(Area Ping Pong).**

4) Press the STORE/ENT key.
The display will show $5U_rE$ PP

5) Press the STORE/ENT key again to start mix down.
The display will count down to Ed 00000, then show FI nI $5H$, and the mixdown is complete.

When you are using this function, you cannot use the "Adjusting the overall level" function. If you execute the "Adjusting the overall level" function, the same MIX ratio will be applied to the entire length of the data during mixdown.

Muting the source sound (AUTO MONITOR)

In the DR4vr's headphone output, the left channel is composed of channels 1 and 3; the right channel is composed of channels 2 and 4 (Lch = CH1 + CH3, Rch = CH2 + CH4). Therefore, if you turn mute OFF for the source sound, the headphone output will become unbalanced. Make sure to turn mute ON for the source sound.

1) Press the SUB-MENU key, then the AUTO MONITOR key.

2) Use the jog wheel to select $5oC$ on **(Source ON) or** $5oC$ oFF **(Source OFF).**

3) Press the ENT/STORE key.
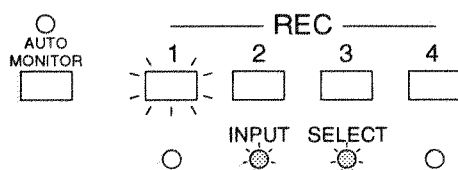
```
   ○         ———— REC ————
 AUTO      \ 1 /    2       3       4          CH1 : Mixdown Channel (Mix sound recording destination)
MONITOR    ‒□‒     □       □       □
   □       / I \                               CH2/CH3 : Mix Source Channel
           INPUT  SELECT
     ○      ·Ö·    ·Ö·      ○
```

	AUTO MONITOR ON	AUTO MONITOR OFF
CH1	Mix Sound (mix source channels 2 and 3)	Mix Sound (mix source channels 2 and 3)
CH2	Mute	CH2 Source Sound
CH3	Mute	CH3 Source Sound
CH4	CH4 Source Sound	CH4 Source Sound

Track clear

This function allows you to erase a specified track. The MIX ratio of the track will be set to Off and the PAN will be set to center.

1) Press the SUB-MENU key, then the "9/UTILITY" key.

2) Use the jog wheel to select *tr CLEAr* (track clear).

3) Press the STORE/ENT key.

4) Use the jog wheel to select the track you wish to erase.

5) Press the STORE/ENT key.
The display will show *SUrE ??*

6) Press the STORE/ENT key again to erase the track.

> *Note: When you are trying to erase a track being used for mixdown, the display will add PP tr ?? (ping-pong track??). If you are certain you wish to erase the track, press the STORE/ENT key. Do not clear tracks that are being used for mixdown. Otherwise, adjustment of the MIX ratio or PAN setting and other functions will not work correctly.*

Adjusting the overall level

This function allows you to adjust the overall level of the tracks used for mixdown by raising or lowering all tracks' MIX ratio.

It is a good idea to set the ratio relatively low during mixdown to prevent overflow, and then use this function to raise the ratio later.

You can also use this function if the level begins to overflow during mixdown. The DR4vr will change the MIX ratio of all tracks and re-calculate their levels.

> *Note: If you repeatedly change the MIX ratio, some extremely slight errors may occur due to approximations used in the calculations. Although these errors will probably be unnoticeable, you can correct them by adjusting the overall level, ideally at the end of operations.*

1) Press the SUB-MENU key, then the "9/UTILITY" key.

2) Use the jog wheel to select *AdJLEuEL* (ADJUST LEVEL).

3) Press the STORE/ENT key.

4) Use the jog wheel to set the level between -12dB and +12dB.

5) Press the STORE/ENT key.

The display will show $5U\cdot\varepsilon$ PP

6) Press the STORE/ENT key again, and the level will change.

> *Note: If you have already recorded or edited data in a track that was used for the ping-pong function, the level of the track will not match that of the mix track. In this case, use the "Adjusting the overall level" function by setting the level to 0dB.*

> *Note: If you have cleared a track that used for the ping-pong function, the sound of that track will be lost when you execute the "Adjusting the overall level."*

> *Note: If the track level is under -24dB, the MIX ratio is set to Off and the track will not be used for mixdown recording.*

- You cannot change the level if any track would exceed +12dB after the change.
- You cannot change the MIX ratio of a track that is not used for mixdown (a track with a MIX ratio of oFF).
- The time taken for the level adjustment depends on the number of tracks being used, since the DR4vr will re-calculate based on all the track data.
- If you set the value to 0dB, the DR4vr will re-calculate the data.
- The same ratio will be applied to the entire length for mixdown. (Even if you specify a different mixdown ratio for each part, the same ratio will be applied to *all* parts.)
- The UNDO function will not work.
- If you are using multiple DR4vrs in remote sync, all devices connected will be set to the level of the master device.

Clearing Ping-pong parameters

The Clear function will erase the sound in the MIX track. Other tracks will not be erased. If you wish to erase all tracks, use the Erase function. (See "Erase" on page 66.) You can use the Clear function to clear the Mix track when you want to start a new mixdown.

All tracks' MIX ratio will be set to Off, and PAN will be set to the center. Follow the procedure below:

1) Press the SUB-MENU key, then the 9/UTILITY key.

2) Select PP $\varepsilon L \varepsilon R\cdot$ (ping-pong clear) using the jog wheel.

3) Press the STORE/ENT key.
The display will show $5U\cdot\varepsilon$ PP

4) Press the STORE/ENT key again.
The mix track will be erased.

Recording in Ping-pong mode

1) Assign the track to be recorded to the source channel.
You can select Channels 2/3/4 in Monaural Ping-pong mode, and Channels 3/4 in Stereo Ping-pong mode.

2) Set the MIX ratio and PAN of the channel to be recorded.
The sound will be mixed to the monitor sound of the channel to which the mix track has been assigned. The source channel monitor sound and recording sound will not be affected.

3) Press the Channel REC key of the channel you wish to record.
The Channel REC key will light up.

Press the Channel REC key again, and it will turn off.

You cannot record data in a channel to which the mix track has been assigned.

4) Press the PLAY key while holding down the REC/MIX key.
The recording will start.

> *Note: If you have selected a virtual track that has been used for ping-pong recording, the display will warn you by showing "oops??." In this case, adjust the overall level to 0dB after recording is finished. See the section "Adjusting the overall level."*

Peak level display

In Ping-pong mode, the peak level is held and can be displayed on the counter. This display allows you to see how far the signal exceeds limits, or how much room you still have.

Setting the peak level display

1) Press the Channel REC 1 key.
The held peak level will be displayed. The displayed range is +12dB to -12dB. If this range is exceeded, the display will indicate *OuEr db* or *UndEr db*.

After this is displayed, it will be reset if audio is output by recording, or if ping-pong is executed, etc.

- This is valid only while the DR4vr is stopped.

- Even if you record, while silence is being output because the Ratio is set to Off, the peak level will not be reset.

- After ping-pong has been executed, the peak level of the sound mixed by the ping-pong operation will be displayed.

> *Note: Since the display is in 0.2dB steps, it may read higher than the level meter.*

Quitting Ping-pong mode

To quit Ping-pong mode, press the SUB-MENU key, then the ESCAPE key. The COPY LED will stop flashing.

Alternatively, press the SUB-MENU key, then the EDIT key. Use the jog wheel to select *norn¬Rl* (NORMAL), then press the STORE/ENT key.

Operate the master device during the Remote sync. When the DL4 is connected press the DL4 SUB-MENU key, then the ESCAPE key (or EDIT key) to quit the mode.

7 Locate Functions

In this chapter, we explain how to use the DR4vr's locate functions. You can locate to a specific point just by entering the time on the display, store and recall up to eight direct locate points using the number keypad, and store and recall up to 100 stack locate points. Unlike tape-based recorders, the DR4vr does not need to rewind or fast forward to locate specific points. DR4vr locate functions are instantaneous.

Locating to a Specific Point

To locate to a specific point:

1) Press the LOCATE key.
- - - - - - - - will appear on the display.

2) Use the number keypad to enter the desired time.
Time values should be entered from left to right. For example, to enter the time 15 minutes 32 seconds 20 frames, press these number keys in the following order: 1, 5, 3, 2, 2, 0.

If you make a mistake while entering the time, press the RESET key, then reenter the time.

3) Press the STORE/ENT key.
The DR4vr will locate to the specified point.

Direct Locate Points (1 ~ 8 Keys)

Up to eight direct locate points can be stored and recalled using the 1 to 8 number keys. These are called direct locate points because you can locate to the stored point directly, just by pressing the respective number key.

Storing Direct Locate Points

To store a direct locate point:

1) Display the desired time on the display.

2) Press the STORE/ENT key.
The display and indicators for number keys 1 to 8 will flash.

3) Press a number key to store the direct locate point.

Storing Direct Locate Points On-the-Fly

To store a direct locate point during playback:

1) Press the STORE/ENT key when the desired time is reached.
The display and indicators for number keys 1 to 8 will flash.

2) Press a number key to store the direct locate point.
Playback will continue uninterrupted while you enter the point.

Recalling Direct Locate Points

To recall a direct locate point:

1) Press the corresponding 1 to 8 number key.
The DR4vr will locate to the stored point.

Stack Locate Points

Up to 100 stack locate points can be stored and recalled. These points are identified using a two-digit number (00 to 99).

Storing Stack Locate Points

To store a stack locate point:

1) **Display the desired time on the display.**

2) **Press the STORE/ENT key.**
The display and indicators for number keys 1 to 8 will flash.

3) **Press the STACK key.**
. . .-- will appear on the display.

4) **Enter a two-digit number.**
The stack locate point will be stored.

Storing Stack Locate Points On-the-Fly

To store a stack locate point during playback:

1) **Press the STORE/ENT key when the desired time is reached.**
The display and indicators for number keys 1 to 8 will flash.

2) **Press the STACK key.**
. . .-- will appear on the display.

3) **Enter a two-digit number.**
The stack locate point will be stored.

Playback will continue uninterrupted while you enter the point.

Recalling Stack Locate Points

To recall a stack locate point:

1) **Press the STACK key.**

2) **Enter the corresponding two-digit number.**
The DR4vr will locate to the stored point.

If no time value has been stored, the DR4vr will locate to *00000000*.

Last Memory

The last memory function allows you to locate the last two points at which the stop key was pressed. This can be used to return to the previous point after locating to a different point, or after playing, recording, rewinding, and fast forwarding. It can also be used when checking direct and stack locate points. First, locate to the point that you want to check, then press the LAST key to return to the previous point.

In addition, this function can be used to check whether a recording was successful. When you stop recording, pressing the LAST key will return to the point at which recording started (presuming that the stop key was pressed before recording). Pressing the LAST key again will locate to the point at which recording was stopped.

The following diagram shows how the last memory function can be used to locate to the start and end points of a recording:
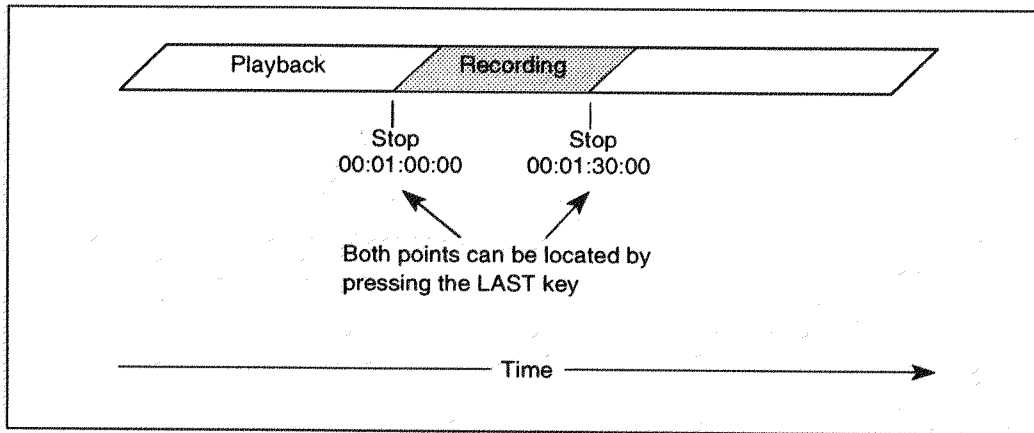
Preroll

The preroll function allows you to locate to a point a few seconds before the specified locate point. For example, if the preroll value is set to 5, and the preroll function is on, the DR4vr will locate to a position 5 seconds before the specified locate point.

Setting the Preroll Time

1) Press the SUB-MENU key.
Its indicator will flash.

2) Press the PREROLL key.
Its indicator will light up, and the current preroll setting will appear on the display.

3) Use the jog wheel, shuttle control, or number keypad to set the preroll time.
Preroll time can be set from 1 to 99 seconds.

4) Press the STORE/ENT key.
The new preroll time will be entered.

Operation

1) Press the PREROLL key.
Its indicator will light up.

The next time you locate to a point, the preroll time will be taken into account.

8 Time Display

The DR4vr can display time in one of three ways: absolute, relative, and BBC:

Absolute Time (ABS)

Absolute time effectively starts at the beginning of the hard disk at zero, and is fixed.

Relative Time (REL)

Relative time, although referenced to absolute time, can be reset to zero at any point, or offset from absolute time by a specified amount. When using MIDI or SMPTE synchronization, relative time can be used to offset the DR4vr.

Bars, Beats, Clocks Display (BBC)

BBC display is intended for use with MIDI synchronization. This display can show up to 9999.04.95 with 1.01.00 as origin (for a beat of 4/4). Based on a tempo map of 1.01.00, the relative time can be displayed down to –9999.04.95. This allows you to find the current song position even if it is out of the MIDI Song Position Pointer's range.

For MIDI synchronization, only up to 1024 bars (4/4 beat) can be synchronized due to the MIDI Standard. See "MIDI Synchronization" on page 85.

The ABS/REL key is used to switch between absolute time and relative time, and the BBC DISPLAY key is used to switch between time display and BBC display.

Setting Relative Time to Zero

To set the relative time to zero:

1) **Locate the point at which you want to set relative time to zero.**

2) **Press the RESET key.**
   Relative time will be selected automatically, and set to **00000000** .

   To return to absolute time, press the ABS/REL key.
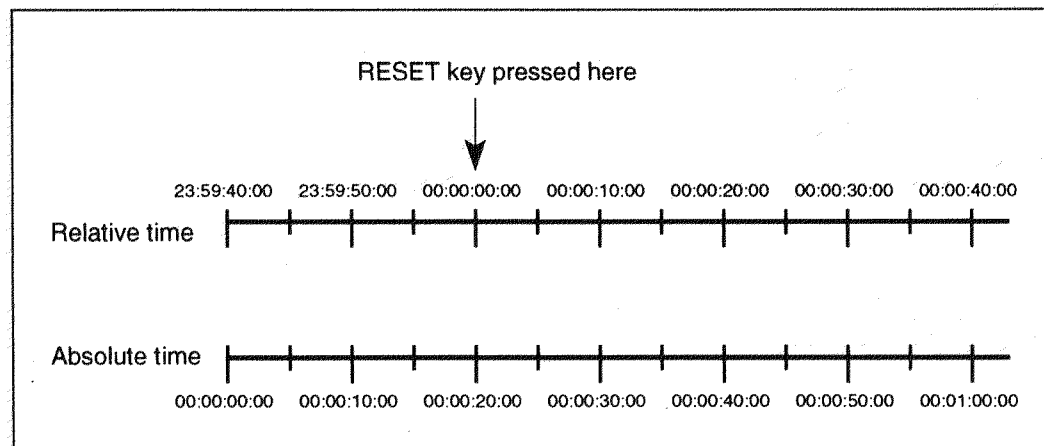
Using the RESET key to set the relative time means that you cannot set the relative time at a point before absolute zero. This is because the relative zero can only be set at a point after the absolute zero. To set relative time to a point before absolute zero, use the offset function. See "Setting a Relative Time Offset" on page 56.

Setting a Relative Time Offset

The relative time can also be set by specifying an offset:

1) **Press the SUB-MENU key.**
   Its indicator will flash.

2) **Press the OFFSET key.**

3) **Use the jog wheel, shuttle control, or number keypad to specify the offset.**

4) **Press the STORE/ENT key.**
   Relative time will now be displayed with the specified offset.

The following diagram shows relative time with a 20 second offset:

```
            Offset set to 00:00:20:00
            |◄──────────────►|

        23:59:40:00   23:59:50:00   00:00:00:00   00:00:10:00   00:00:20:00   00:00:30:00   00:00:40:00
Relative time  ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤


Absolute time  ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤
        00:00:00:00   00:00:10:00   00:00:20:00   00:00:30:00   00:00:40:00   00:00:50:00   00:01:00:00
```
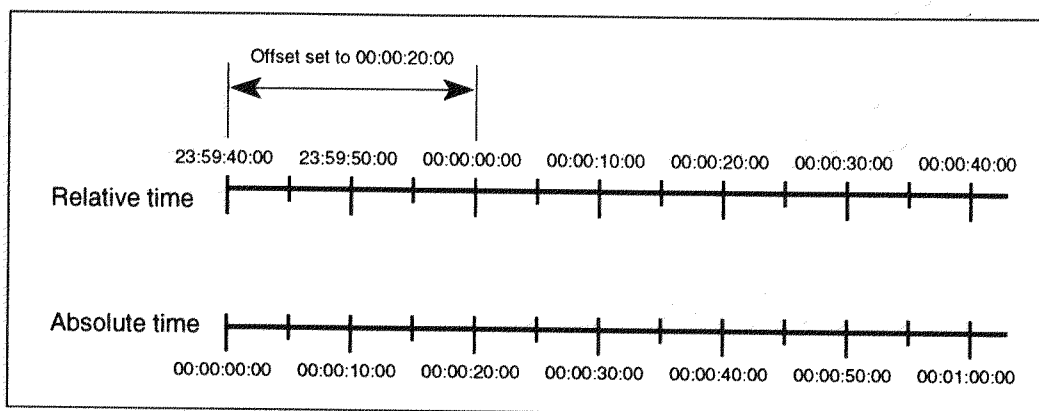
Note on setting a negative time offset

If you set a negative time offset while the BBC display is shown, relative time 0001:01:00 will precede absolute time 0001:01:00. If the offset is small, playing in relative time will soon exceed 24 hours absolute time. Since the BBC display cannot show time in excess of 24 hours, an absolute time indication after 24 hours (midnight) will be out of the BBC display range.

When controlling a MIDI sequencer with MIDI sync, setting a negative offset will disable sequencer playback. As an alternative, insert a blank bar at the top of the sequencer song. This will produce the same result as setting a negative offset on the DR4vr.

Time Display Relative to Any Point

Relative time can be displayed relative to any specified time, not just zero:

1) Press the STORE/ENT key.
The display and indicators for number keys 1 to 8 will flash.

2) Press the RESET key twice.
– – – – – – – – will appear on the display.

3) Use the number keypad to enter the desired time.

4) Press the STORE/ENT key.
Relative time will now be displayed relative to the specified time.
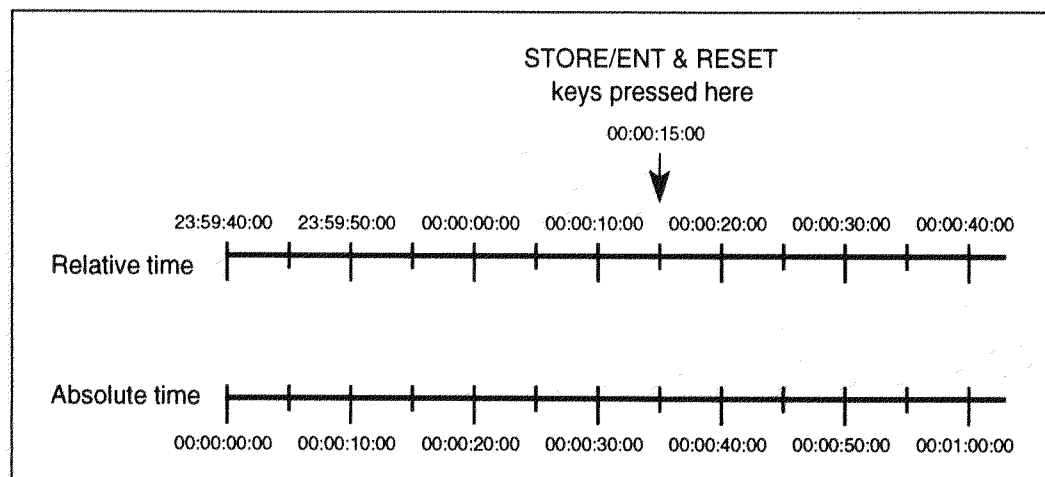
9 Editing

In this chapter, we explain the editing functions.

There are seven edit functions: copy, copy+insert, move, move+insert, erase, delete, and insert.

Copy the specified section to any channel. Material at the destination is overwritten.

Copy+insert the specified section to any channel. Subsequent material is moved forward.

Move the specified section to any channel. Destination material is overwritten.

Move+insert the specified section to any channel. Subsequent material is moved forward.

Erase the specified section.

Delete the specified section and move subsequent material backward.

Insert a blank section of a specified length and move subsequent material forward.

Notes on the editing functions

- You can use any of the seven edit functions on any virtual track. In Ping-pong mode, however, if you edit the source track after carrying out ping-pong mixdown, you will not be able to change the MIX ratio or PAN setting later ("Ping-pong mode" on page 41.) Do not edit tracks used for mixdown.

- While editing, consider your hard disk capacity. Using the editing functions such as copy, insert, etc. repeatedly may take up a large amount of space in the disk. Make sure that your hard disk capacity is large enough to accommodate all edits. (Refer to "Hard Disk Size" on page 70.)

- You must first assign the virtual tracks to Channels 1-4 before carrying out any of the edit functions. See "How to Assign a Virtual Track to a Channel" on page 27.

Undoing an Edit

Before looking at each edit function, we'll explain how to undo an edit. This can be used when edits don't turn out as planned. It also gives you the freedom to experiment with edits. Undoing an edit is much like undoing a recording. See "Recording Undo" on page 34.

To undo an edit:

1) Press the UNDO key.
The UNDO indicator will light up. While this indicator is lit, the DR4vr will play the material as it was before the edit.

To switch back to the edited material:

2) Press the UNDO key again.
Before performing another edit or starting another recording, you must decide whether you want to keep the edit or not. Once another edit or recording is made, the undo function will apply to that new edit or recording.

Once you've decided, leave the UNDO function set as required, then perform another edit or start a new recording. If you don't make any more edits or record anything new, you will be able to undo the last edit even after the DR4vr has been powered off and on.

Copy

The start point and end point of the section to be copied are identified using the in point and out point respectively. The audio data is then copied from the source channel to the destination channel, overwriting existing material. The following diagram shows the copy procedure:
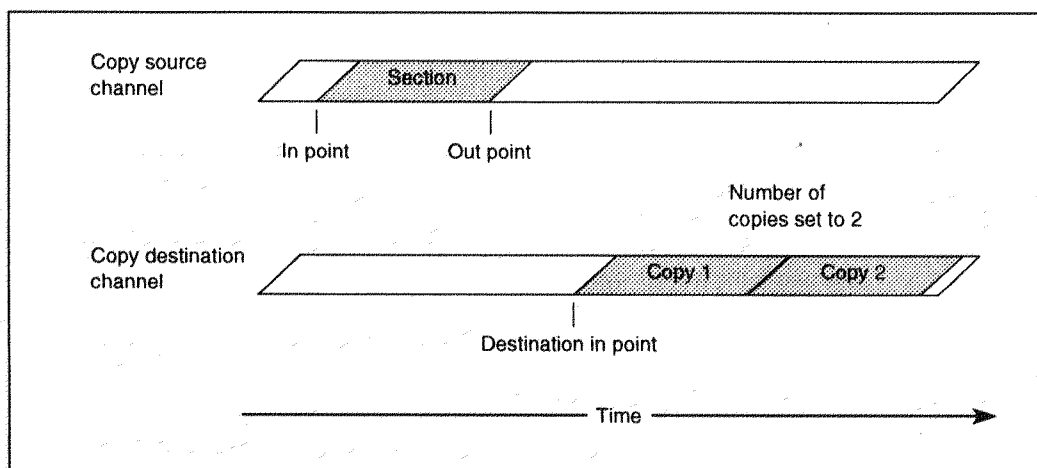
Specifying the Copy Source Section

1) To set the IN point, display the desired time on the display, press the STORE/ENT key, then press the IN POINT key.
See "Specifying the In Point & Out Point" on page 20.

2) To set the OUT point, display the desired time on the display, press the STORE/ENT key, then press the OUT POINT key.
See "Specifying the In Point & Out Point" on page 20.

You can check the length of the specified section by pressing the IN POINT and OUT POINT keys simultaneously (does not work for BBC display).

To play the specified section, press the <<PLAY>> key.

The play to out function can also be used to check the in and out points. See "Play to Out" on page 37.

Specifying the Destination In Point

3) Display the desired IN point for the destination.

4) Press the EDIT key to select the copy function.
The COPY indicator will light up, and *Edl t* will appear on the display.

5) Press the STORE/ENT key.
The destination in point will be stored.

Specifying the Number of Repeats

While *rEPEREO 1* is displayed on the display:

6) Use the jog wheel or shuttle control to specify the number of times that you want to repeat the copied section.
The number of repeats can be set from 1 to 99.

Selecting the Source & Destination Channels

The INPUT SELECT keys are used to select the copy source, and the Channel REC/VIRTUAL TRACK keys are used to select the copy destination.

You can copy one channel or a number of channels simultaneously.

7) Use the INPUT SELECT keys to select the copy source channels.
The corresponding indicators will light up.

8) Use the Channel REC/VIRTUAL TRACK keys to select the copy destination channels.
The corresponding indicators will light up.

If only one channel is selected as a source, only one destination channel can be selected.

If two channels are selected as sources, two destination channels can be selected.

If three or four channels are selected, the corresponding channels are automatically selected, i.e., 1 to 1, 2 to 2, etc.

Executing the Copy

9) Press the STORE/ENT key or REC/MIX key to execute the copy.
While the copy is in progress, *bUSy* will be shown on the display.

FI nl SH will appear when the copy is complete.

Copy+Insert

The copy+insert function works basically the same as the copy function. However, unlike the copy function, which overwrites any existing material at the specified destination, the copy+insert function moves any existing material forward. The following diagram shows the procedure for copy+insert:
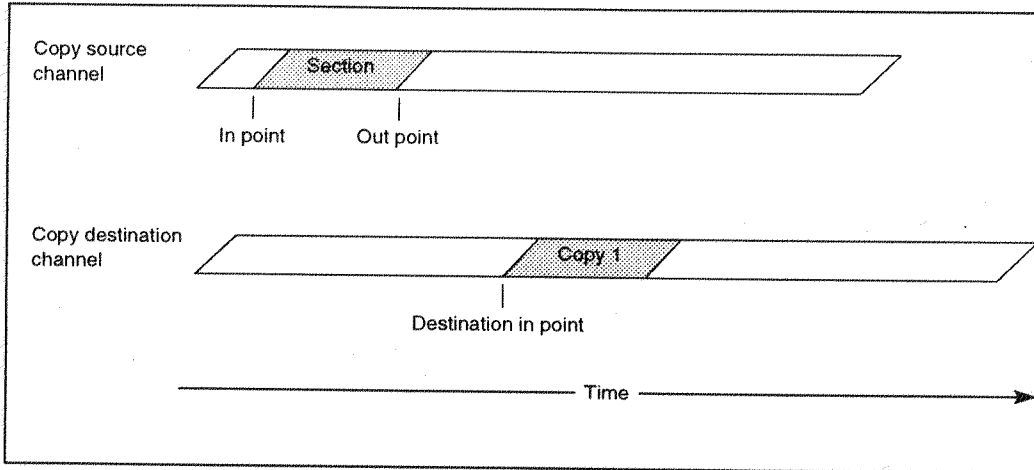
Follow the procedure for "Copy" on page 60. At step 4, select the copy+insert function.

Move

The start point and end point of the section to be moved are identified using the in point and out point respectively. The audio data is then moved from the source channel to the destination channel, overwriting existing material. The following diagram shows the procedure for move:
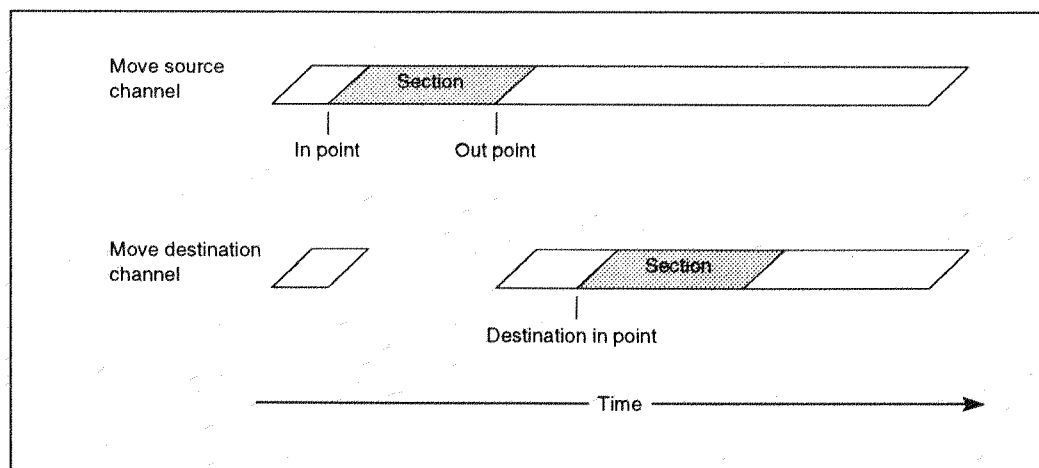
Specifying the Section to Move

1) **To set the in point, display the desired time on the display, press the STORE/ENT key, then press the IN POINT key.**
   See "Specifying the In Point & Out Point" on page 20.

2) **To set the out point, display the desired time on the display, press the STORE/ENT key, then press the OUT POINT key.**
   See "Specifying the In Point & Out Point" on page 20.

   You can check the length of the specified section by pressing the IN POINT and OUT POINT keys simultaneously (does not work for BBC display).

   To play the specified section, press the <<PLAY>> key.

   The play to out function can also be used to check the in and out points. See "Play to Out" on page 37.

Specifying the Destination In Point

3) **Display the desired in point for the destination.**

4) **Press the EDIT key repeatedly to select the move function.**
   The MOVE indicator will light up, and *Edl* will appear on the display.

5) **Press the STORE/ENT key.**
   The destination in point will be stored.

Specifying the Number of Repeats

While *rEPEAtD l* is displayed on the display:

6) **Use the jog wheel or shuttle control to specify the number of times that you want to repeat the moved section.**
   The number of repeats can be set from 1 to 99.

Selecting the Source & Destination Channels

The INPUT SELECT keys are used to select the move source, and the Channel REC/VIRTUAL TRACK keys are used to select the move destination.

You can move a section from one channel or a number of channels simultaneously.

7) Use the INPUT SELECT keys to select the move source channels.
The corresponding indicators will light up.

8) Use the Channel REC/VIRTUAL TRACK keys to select the move destination channels.
The corresponding indicators will light up.

If only one channel is selected as a source, only one destination channel can be selected.

If two channels are selected as sources, two destination channels can be selected.

If three or four channels are selected, the corresponding channels are automatically selected, i.e., 1 to 1, 2 to 2, etc.

Executing the Move

9) Press the STORE/ENT key or REC/MIX key to execute the move.
While the move is in progress, *bUSY* will be shown on the display.

FI nI SH will appear when the move is complete.

Move+Insert

The move+insert function works basically the same as the move function. However, unlike the move function that overwrites any existing material at the specified destination, the move+insert function moves any existing material forward. The following diagram shows the procedure for move+insert:
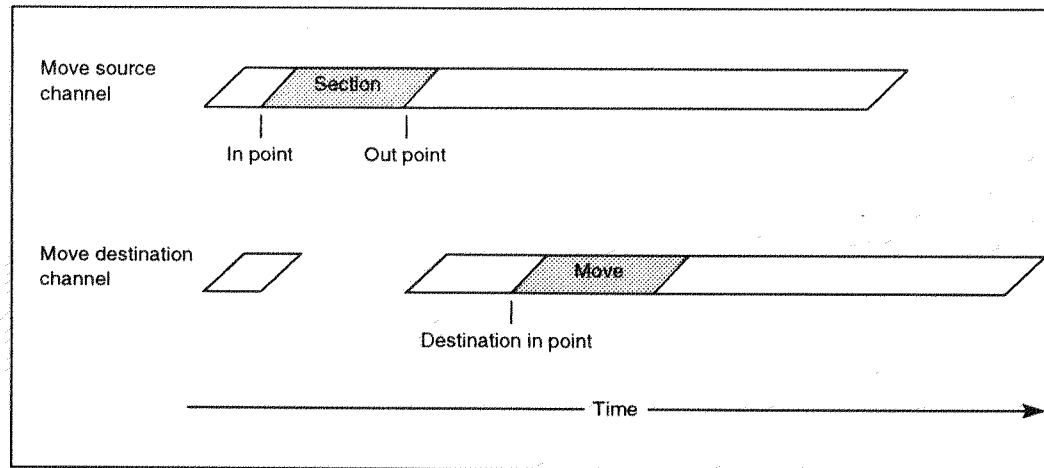
Follow the procedure for "Move" on page 63. At step 4, select the move+insert function.

Erase

The start point and end point of the section to be erased are identified using the in point and out point respectively. The audio data is then erased, leaving blank space (silence) in its place. The following diagram shows the procedure for erase:
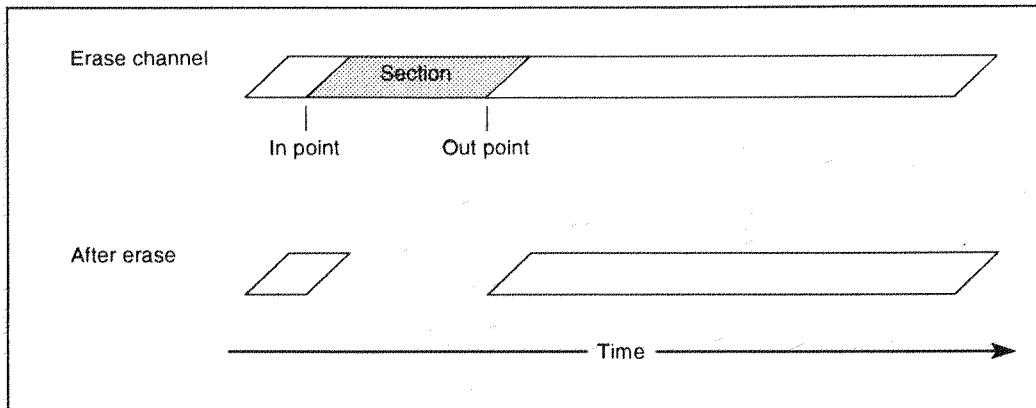
Specifying the Section for Erasure

1) To set the in point, display the desired time on the display, press the STORE/ENT key, then press the IN POINT key.
The in point will be stored.

2) To set the out point, display the desired time on the display, press the STORE/ENT key, then press the OUT POINT key.
The out point will be stored.

You can check the length of the specified section by pressing the IN POINT and OUT POINT keys simultaneously (does not work for BBC display).

To play the specified section, press the <<PLAY>> key.

The Play to Out function can also be used to check the in and out points. See "Play to Out" on page 37.

3) Press the EDIT key repeatedly to select the erase function.
The ERASE indicator will light up, and *Edi t* will appear on the display.

4) Press the STORE/ENT key.
ErASE will appear on the display.

Selecting Channels for Erasure

5) Use the Channel REC/VIRTUAL TRACK keys to select channels for erasure.
The corresponding indicators will light up.

Executing Erase

6) Press the STORE/ENT key or REC/MIX key to execute erase.
While erasing is in progress, *bUSY* will be shown on the display.

FI nI SH will appear when erase is complete.

Delete

The delete function works basically the same as the erase function. However, the delete function also moves any subsequent material back, removing any gap of silence. The following diagram shows the procedure for delete:
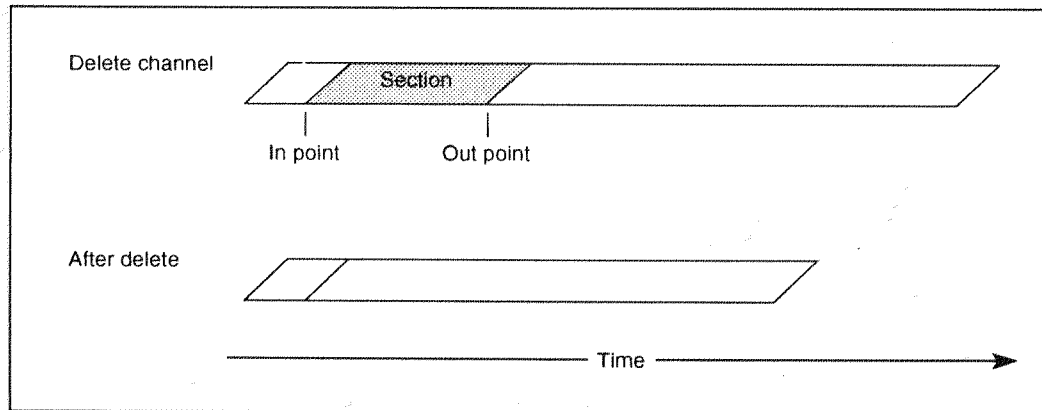
Follow the procedure for "Erase" on page 66. At step 3, select the delete function.

Insert

The Insert function enables you to insert a blank (silent) section of a specified length at a specified location, and move subsequent material forward. The following diagram shows the procedure for insert:
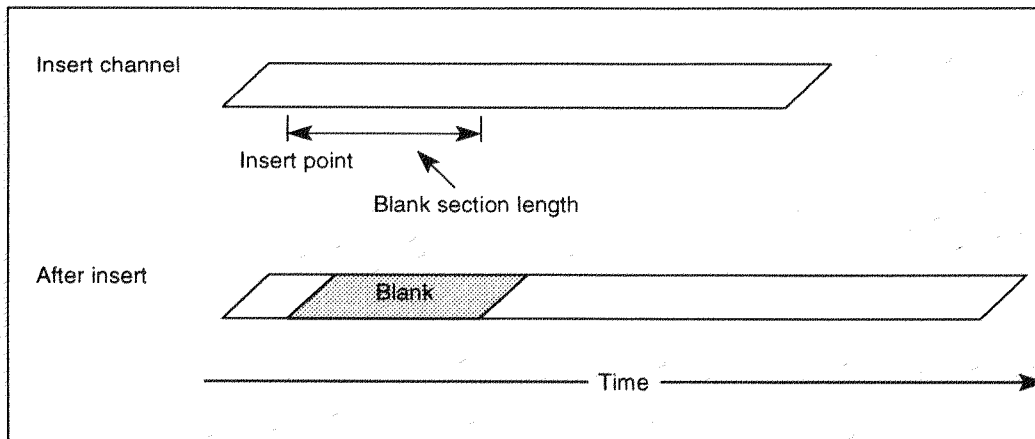
Specifying the Insert In Point

1) To set the in point, display the desired time on the display.

2) Press the EDIT key repeatedly to select the insert function.
The INSERT indicator will light up, and *Edl t* will appear on the display.

3) Press the STORE/ENT key.
The display will show - - - - - - - -

4) Use the number keypad to specify the length of the blank section to be inserted.

Selecting Channels for Insert

5) Use the Channel REC/VIRTUAL TRACK keys to select the insert channels.

Executing Insert

6) Press the STORE/ENT key or REC/MIX key to execute insert.
While insert is in progress, *bUSY* will be shown on the display.

FI nI SH will appear when the insert is complete.

10 Hard Disks

This chapter examines hard disks. Your DR4vr should already have an optional internal hard disk installed, so you have everything you need to be able to start recording. If the hard disk has not yet been formatted, see "Formatting New Disks" on page 74.

If you want to increase the available recording time by adding more storage, read through this chapter to gain a better understanding of how the DR4vr works with hard disks. When upgrading, you can keep the internal hard disk and just add an external hard disk via the SCSI-A bus. Alternatively, you could replace the internal hard disk with a larger one.

Only certain hard disks can be used with the DR4vr, so please consult your Akai professional dealer. (Also, please see "ABORT MESSAGE ON-OFF mode" on page 78.)

Choosing a Hard Disk

There are many types of hard disks currently available, each with slightly different specifications. Your Akai dealer will be able to provide you with information about which hard disks are best for use with the DR4vr. The following points should also be borne in mind:

• Is the hard disk fitted with two SCSI connectors? This will allow you to add more hard disks simply by connecting to the SCSI-A bus daisy chain.

• Are the SCSI connectors 50-way Amphenol types like the one on the rear panel of the DR4vr? Some manufacturers use different types of connectors for SCSI connections. Although there are connection adaptors available, it is much simpler to standardize with one type.

• Can the SCSI ID number be set? Some of the earlier external disk drives were not fitted with SCSI ID switches. If each hard disk can be set to any SCSI ID, it allows greater flexibility when setting up a SCSI daisy chain.

• Does it have internal or external SCSI termination? Hard disks supplied with an external terminator can be connected at any position in a SCSI daisy chain. Some hard disks that have a fixed internal terminator must always be connected at the end of the SCSI daisy chain, thus reducing setup flexibility. This is especially awkward when you have two such hard disks.

• Is the access time fast enough? Most currently available hard disks have relatively quick access times. However, some older drives can be quite slow. When the DR4vr is playing and recording at the same time, the disk drive is continuously reading and writing data. If the hard disk's average seek time is slower than 19 ms, performance may be affected.

• Is the data transfer rate high enough? This is usually measured in Megabits per second (Mbit/s). A transfer rate slower than 1.5MByte/s (12Mbit/s) may affect the performance of the DR4vr.

MO Disks

Magneto Optical (MO) disks operate more slowly than hard disks, so they cannot be used with the DR4vr for recording. However, they can be used to back up your data.

Hard Disk Size

The total available recording time depends on the total size of all storage media—that is, the internal hard disk and any external hard disks connected via the SCSI-A bus. As can be seen from the table below, the sampling frequency also affects the available time. Basically, with a higher sampling frequency, less time is available. This is because higher sampling frequencies provide a better audio bandwidth, which in turn requires more storage space.

The "1 Channel" column shows how many channel minutes are available with some typical sizes of hard disk. A channel minute indicates the total time available if only one channel is recorded. The "4 Channel" column shows the amount of time that is available to each channel, and is just the "1 Channel" column value divided by four. For example, 100MB at 48 kHz provides 17 channel minutes, that's about 4.2 minutes per channel. However, each channel is not restricted to 4.2 minutes, and can use as much or as little of the available storage media as required until it has all been used. So, for example, one channel may use 8 minutes, another channel 3 minutes, another 5 minutes, and the last channel 1 minute.

Hard Disk Size	Available Minutes:Seconds (Approx.)					
	32 kHz		44.1 kHz		48 kHz	
	4 Channel	1 Channel	4 Channel	1 Channel	4 Channel	1 Channel
4GB	265:40	1062:40	192:46	771:06	177:09	708:36
2GB	132:50	531:20	96:23	385:33	88:34	354:18
1.2GB	79:42	318:48	57:50	231:20	53:8	212:35
650MB	43:10	172:41	31:19	125:18	28:47	115:8
330MB	21:55	87:40	15:54	63:37	14:36	58:27
240MB	15:56	63:46	11:34	46:16	10:37	42:31
128MB	8:30	34:32	6:10	24:40	5:40	22:40
100MB	6:38	26:34	4:49	19:16	4:25	17:42
88MB	5:50	23:22	4:14	16:57	3:53	15:35
44MB	2:55	11:41	2:07	8:28	1:56	7:47

Theoretically, a maximum of 64GB of hard disk can be connected to the DR4vr. However, the DR4vr cannot record and playback more than 24 hours worth of material (23:59:59:00).

SCSI

The DR4vr uses the SCSI connection format for connecting external hard disks. Pronounced "scuzzy", SCSI (Small Computer System Interface) is often used for connecting computer peripherals such as hard disks, scanners, etc. It provides a relatively fast data transfer rate, making it ideal for digital audio applications.

Up to eight devices can be connected in a SCSI daisy chain. One device acts as the controller, and the others as slaves. The controller can communicate with any slave device. Typically, the slave devices communicate with the controller only. In a DR4vr system, the DR4vr functions as the controller, writing to and reading from the connected slaves.

SCSI-A & SCSI-B

The DR4vr has two SCSI buses: SCSI-A and SCSI-B. The SCSI-A bus is used to connect external hard disks for recording. The SCSI-B bus is for backing up to an MO disk and connecting to personal computers. The optional IB-111S interface card must be installed to use the SCSI-B bus.

SCSI Cables

Use only quality SCSI cables when connecting SCSI devices. Cables are available in a number of different lengths; however, you should pay particular attention to the total length of the SCSI daisy chain. It is not the length of each cable that is important, but the total length of all cables used in the daisy chain. The total length must not exceed 6 meters (20 ft.).

Total length of SCSI cables
must not exceed 6 m (20ft)
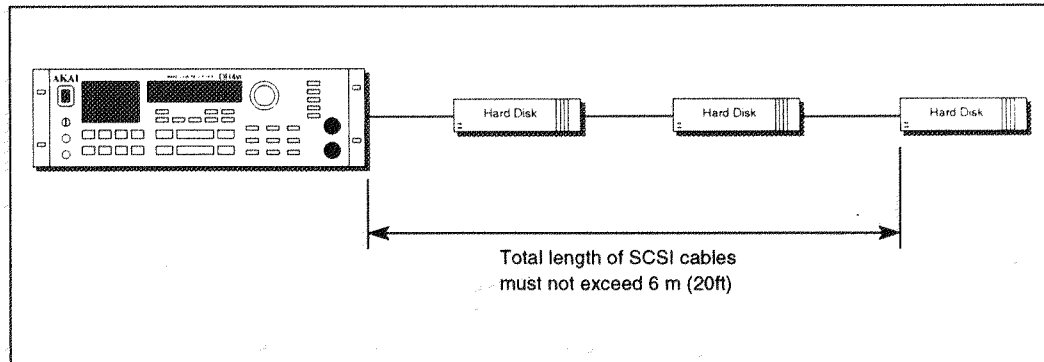
SCSI IDs

Each SCSI device in the SCSI daisy chain is assigned its own ID number. SCSI-A ID numbers can be set from 0 to 7. The DR4vr itself uses ID 7, and its internal hard disk ID 0. Use ID numbers other than 0 and 7 for hard disks connected via SCSI-A.

Caution: If you do set an external hard disk's ID number to that used by the internal hard disk, the DR4vr will not be able to detect an error, so no error message will appear. In this case, the DR4vr may appear to work correctly, but recording will not be performed correctly, and existing material may be damaged. You must take care when setting SCSI ID numbers.

The following diagram shows how SCSI IDs should be set for a typical DR4vr SCSI daisy chain:

DR4vr: ID 7
Internal hard disk: ID 0
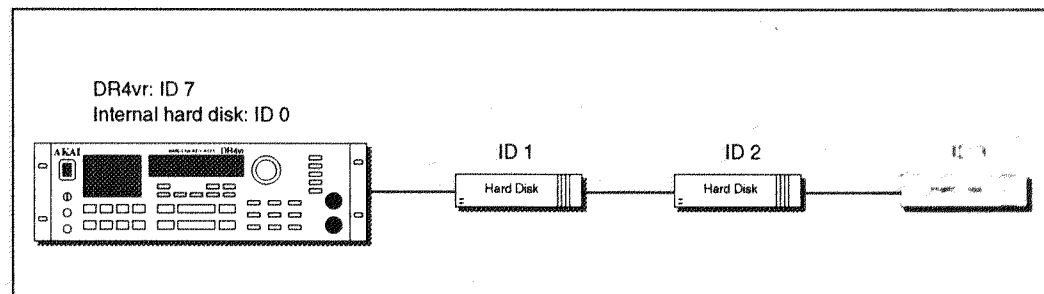
SCSI Termination

The ends of a SCSI daisy chain must be terminated correctly. Otherwise, data errors, system crashes, etc., may occur. Termination at the DR4vr end of the chain is taken care of by the DR4vr. At the other end of the chain you must fit a terminator. Some SCSI devices have a terminator built-in. This type of device must always be connected at the end of the daisy chain. Other devices are supplied with an in-line type terminator that you must connect to the unused SCSI connector. The following diagram shows how a SCSI daisy chain should be terminated:
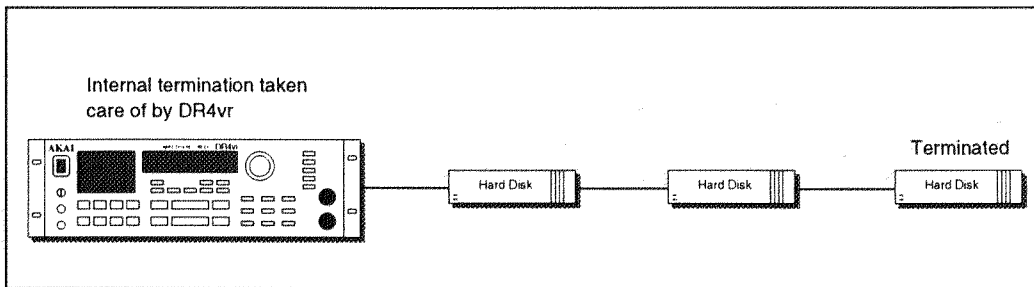
The following diagram shows an example of an in-line terminator connected to a hard disk:
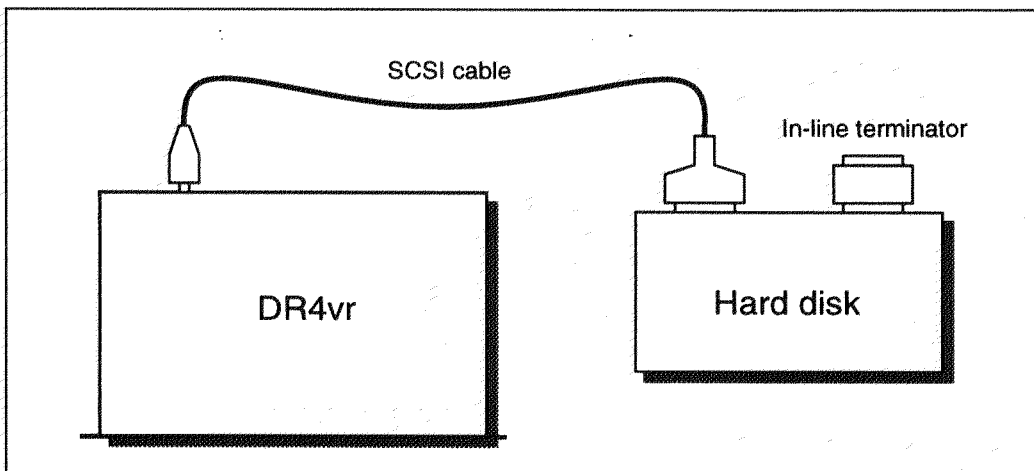
> **Note:** *The terminator switch on the rear panel of the DR4vr is used to terminate the SCSI-B bus, which you can use if you add an optional IB-111S SCSI-B board to interface with a personal computer. The terminator switch is not related to the termination of the SCSI-A bus.*

Checking for Disks on the SCSI-A Bus

To check the status of a hard disk connected to SCSI-A bus:

1) Press the SUB-MENU key.
Its indicator will flash.

2) Press the DISK key.
The SCSI ID of all hard disks that have been formatted and are ready for recording will appear.

A flashing SCSI ID indicates that the DR4vr has acknowledged a connected hard disk, but the disk has not yet been formatted.

If you have connected a hard disk, but its SCSI ID does not appear, make sure that all SCSI IDs are set correctly, all SCSI cables are connected correctly, and the hard disk is powered on.

External Hard Disk Operating Precautions

- Before connecting a hard disk, make sure that the DR4vr and hard disk are powered off. If a hard disk is connected with its power on it could be damaged.

- Always power on the external hard disks before the DR4vr. Otherwise, the DR4vr will not recognize them.

- When you connect a hard disk that has already been used for recording with another DR4vr, or have connected then disconnected it from the same DR4vr, erase all the material on the disk or format it before recording any new material.

- New unformatted disks can be connected to the DR4vr quite safely, and will not be used until formatted. The letter "F" will appear on the display when the DR4vr performs a hard disk search. The letter "F" will blink when the DISK sub-menu function is used.

- Do not set an external hard disk's SCSI ID number to that used by the internal hard disk. Operation will be unpredictable and any recorded material may be destroyed. See "SCSI IDs" on page 71.

- Do not power off a hard disk while it is accessing data. The left-most dot on the DR4vr display indicates that a hard disk is being accessed.

- Do not move or disturb a hard disk while it is powered on, especially when it is accessing data.

- Hard disks should be mounted horizontally or vertically when in use. See the hard disk's operating manual for more details.

Formatting New Disks

New hard disks must be formatted before you can use them for recording. Formatting prepares a disk for storing digital audio data. External disks and the internal hard disk are identified by their SCSI ID. Make sure that you know the SCSI ID of the disk you want to format before starting this procedure.

> *Note: You cannot use a hard disk that was initially used on a DR4d with the DR4vr because the data format is not compatible. You must first erase or re-format the hard disk before using it with the DR4vr. If a hard disk contains data you need, back it up first on DAT tape or MO disk before erasing or re-formatting the disk with the DR4vr so that you can later restore the data.*

To format a disk:

1) **Press the SUB-MENU key.**
   Its indicator will flash.

2) **Press the FORMAT key.**
   I d   0 will appear on the display.

3) **Use the jog wheel, shuttle control, or number keypad to select a SCSI ID. If you wish to format all connected hard disks that are recognized by the DR4vr, use the jog wheel or shuttle control to select *ALL*.**
   The selected SCSI ID should correspond with that of the disk that you want to format.

> *Note: If you have a number of disks connected, make sure that you select the correct SCSI ID.*

4) **Press the STORE/ENT key.**
   ErASE will appear on the display.

5) **Use the jog wheel or shuttle control to select *For*.**

6) **Press the STORE/ENT key.**
   The message *SUrE ??* will appear on the display.

> *Important: If you are reformatting a disk, please note that all existing data will be permanently erased. Back up any data that you want to keep before reformatting.*

7) **If you are sure that you want to re-format the hard drive, press the STORE/ENT key again to start formatting.**
   While formatting is in progress, *For* will flash on the display. Disk formatting does take time. The larger the disk, the longer it takes.

   The formatting process starts with the hard disk with the lowest SCSI ID number.

> *Note: The format process can be aborted by pressing the ESCAPE key. If you are formatting multiple hard disks, the hard disk that is currently formatting will continue until finished; then the process will abort.*

When disk formatting is complete, *FI nI SH* will appear on the display.

8) **Press the STORE/ENT key.**
   The SCSI IDs of connected disks will appear on the display as the DR4vr quickly checks them. The formatted disk is now ready for recording.

> *Note: If you have aborted the format operation, you cannot use the disk as it is on the DR4vr. You need to re-format the disk if you wish to use it on your DR4vr.*

Erasing Disks

This function allows you to erase all material on a disk before starting a new session. You may want to back up the existing material for future use before proceeding. See "Backup" on page 79. You can also use this function to make it possible to use a hard disk that was previously used with a DR4d.

To erase a disk:

1) Press the SUB-MENU key.
Its indicator will flash

2) Press the FORMAT key.
I d   0 will appear on the display.

3) Use the jog wheel, shuttle control, or number keypad to select a SCSI ID. If you wish to erase data from all connected hard disks that are recognized by the DR4vr, use the jog wheel or shuttle control to select *ALL* **.**
The selected SCSI ID should correspond with that of the disk that you want to erase.

> *Note: If you have a number of disks connected, make sure that you select the correct SCSI ID.*

4) Press the STORE/ENT key.
ErASE will appear on the display.

5) Press the STORE/ENT key.
The message *SUrE ??* will appear on the display.

> ***Important:*** *This function erases all material on a disk – permanently. Back up any data that you want to keep before erasing.*

6) If you are sure, press the STORE/ENT key again to start erasing.
Disk erasure is relatively quick.

> *Note: The erasing process starts with the hard disk with the lowest SCSI ID number when ALL is selected. The erase process can be aborted by pressing the ESCAPE key. The hard disk that is currently being erased will continue until finished; then the process will abort.*

When disk erasure is complete, *FI nI SH* will appear on the display.

7) Press the STORE/ENT key.
The SCSI IDs of connected disks will appear on the display as the DR4vr quickly checks them. The erased disk is now ready for recording.

Data Alignment

The data alignment function enables you to de-fragment the hard disk. When the second dot from the left on the display remains constantly lit, it indicates that the data on the hard disk has become fragmented, and that the DR4vr is working too hard to access data.

What is Data Fragmentation?

When you make a recording onto a newly-formatted or erased disk, data is written to the disk in a continuous series of sectors. During playback, the disk drive does not have to work too hard to read the data, because it is in this continuous series of sectors. However, after you perform many edits, the data will be spread across numerous sectors on the disk—in other words, fragmented. In this case, the disk drive will have to work harder to retrieve all the data necessary for continuous audio playback. If the fragmentation is quite severe, the second dot from the left on the display will remain constantly lit. You may also notice some errors during playback.

The alignment function can be used to reorganize the data into a continuous series of sectors.

To align the data and de-fragment the hard disk:

1) **Press the SUB-MENU key.**
   Its indicator will flash.

2) **Press the ALIGN key.**
   RL ICn will appear on the display.

3) **Press the STORE/ENT key.**
   The message *SUrE ??* will appear on the display.

4) **If you are sure, press the STORE/ENT key again to align the data.**

> *Note: Press the ESCAPE key at any time to cancel the alignment operation.*

Data alignment will take some time.

The display screen shows the countdown of the alignment process for each "path" as follows:

Path 1 ——— *RL 1   123⌐*

Path 2 ——— *RL2   123⌐*

Path 3 ——— *RL3   123⌐* —— When these numbers count down to 000, the alignment of the path is complete.
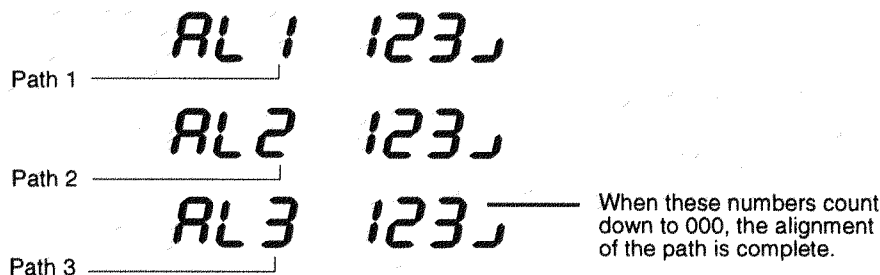
- Path 1

  In this path, the alignment function will remove small segments that tend to cause playback errors. This process remedies slow hard disk problems.

- Path 2

  In this path, the alignment function will group as many segments as possible to reduce their number. Also, it will improve the efficiency of the hard disk and increase available space. This is especially useful when there is extensive fragmentation and the DR4vr is unable to use available space effectively.

- Path 3

  The alignment function will collect the unused portions of the disk so you can use the space more effectively.

> **Note:** *If there is insufficient available space on the disk, the Path 2 process may not work very well.*

When these three digits for each path reach 000, data alignment is complete and *FI nI SH* will appear on the display.

5) **Press the STORE/ENT key.**

ABORT MESSAGE ON-OFF mode

The DR4vr uses an ABORT message that conforms to SCSI standards for fast operation. However, some hard disks may hang up on the DR4vr's ABORT message. The ABORT MESSAGE ON/OFF mode is designed to prevent system lock up.

ABORT ON: This mode uses the ABORT message.

ABORT OFF: This mode does not use the ABORT message (DR4vr default setting).

Setting the ABORT OFF mode

> *Note: An ABORT ON/OFF cannot be set from a connected DL4.*

1) Press the SUB-MENU key.

   The indicator lights up.

2) Press the "2" key.

   The indicator for the "2" key flashes and the indicator for the SUB-MENU lights up.

3) Press the "2" key again.

   ABORT ON/OFF mode is engaged.

4) Select *Abort oFF* (ABORT OFF) using the jog wheel or shuttle control.

5) Pressing the STORE/ENT key will display *SUrE ??*

6) Press the STORE/ENT key again to confirm.

> * *Note: Consult the nearest AKAI professional dealer for the appropriate ABORT ON/OFF mode setting. Certain hard disks work faster in ABORT ON mode. However, Akai recommends the ABORT OFF mode as it works in most cases.*

11 Backup

In this chapter, we explain how to back up material recorded on the DR4vr. You can back up to either a DAT recorder via digital I/O, or to an external MO disk or hard drive via SCSI-B.

Backup to DAT

To use a DAT recorder for back up, it must have digital inputs and outputs.

Note: Before backing up to a DAT recorder, make sure that the volume controls on any equipment connected to the DAT recorder's outputs are turned fully down. The sound output by the DAT recorder during backup may damage your loud speakers.

DAT Backup Connection
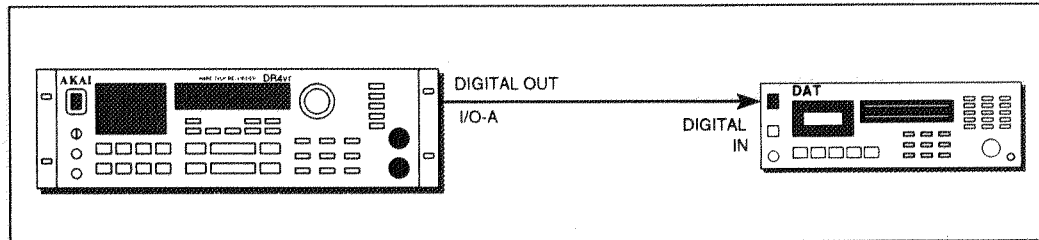
Backing Up the Entire Disk

The following procedure explains how to back up the entire contents of a hard disk:

1) **Press the SUB-MENU key.**
   Its indicator will flash.

2) **Press the BACKUP key.**

3) **Use the jog wheel or shuttle control to select *d IC ItRL* (DIGITAL).**

4) **Press the STORE/ENT key.**

5) **Use the jog wheel to select to select *RLL***

6) **Press the STORE/ENT key.**
   The message *bUSY* will appear briefly, then *rERdY ??* will appear.

7) **Start recording on the DAT recorder.**

8) **Press the STORE/ENT key to start the backup.**
   The DR4vr will send the data to the DAT recorder, and a number corresponding to the amount of data to be backed up will appear on the display. While the backup is in progress, this number will gradually decrease and the level meters for CH1- CH4 will move.

   Backup is complete when the number reaches zero. Depending on the amount of data, backup does take some time.

Backing Up Certain Material Only

The following procedure explains how to back up just the material between the in point and out point:

1) **Set the in point and out point.**
   See "Specifying the In Point & Out Point" on page 20.

2) **Press the SUB-MENU key.**
   Its indicator will flash.

3) **Press the BACKUP key.**

4) **Use the jog wheel or shuttle control to select** *d IG IŁRL* .

5) **Press the STORE/ENT key.**

6) **Use the jog wheel to select to select** *in- -ouŁ* .

7) **Press the STORE/ENT key.**
The message *bUSY* will appear briefly, then *rERdY PP* will appear.

8) **Start recording on the DAT recorder.**

9) **Press the STORE/ENT key to start the backup.**
The DR4vr will send the data to the DAT recorder, and a number corresponding to the amount of data to be backed up will appear on the display. While the backup is in progress, this number will gradually decrease and the level meters for CH1- CH4 will move. Backup is complete when it reaches zero.

Depending on the amount of data, backup does take some time.

Loading from DAT

If the data to be loaded overlaps some data that already exists on the hard disk, the existing data has priority, and the new data cannot be loaded. In this case, you must erase the existing data first.

> *Note: Before loading from a DAT recorder, make sure that the volume controls on any equipment connected to the DAT recorder's outputs are turned fully down. The sound output by the DAT recorder while loading may damage your loud speakers.*

DAT Loading Connection
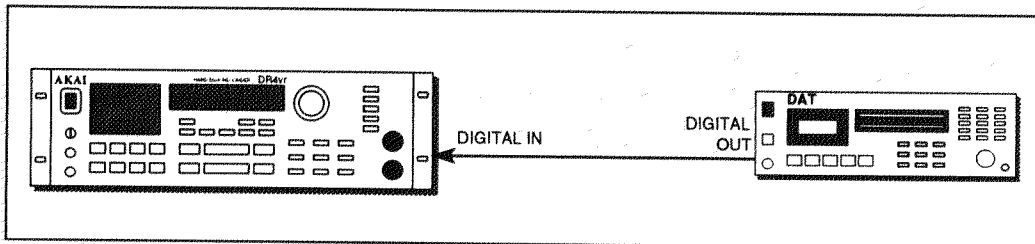
1) **Press the SUB-MENU key.**
Its indicator will flash.

2) **Press the LOAD key.**

3) **Use the jog wheel or shuttle control to select** *d IG IŁRL* .

4) **Press the STORE/ENT key.**
- - - - - - - - will appear on the display.

5) **Use the number keypad to enter the time from which you want the loaded material to start.**
If you enter the wrong time, press the RESET key, then reenter the value.

If you want the material to start from the same time as it did before it was backed up, do not enter a value. Leave the display as - - - - - - - - .

6) **Press the STORE/ENT key.**
rERdY PP will appear on the display.

7) **Rewind the DAT, and start playback.**
The DR4vr will load the incoming data, and a number corresponding to the amount of data to

be loaded will appear on the display. While loading is in progress, this number will gradually decrease and the level meters for CH1 and CH2 will move.

When the loading is complete, *FI nI 5H* will appear on the display.

If the loading fails, an error message will appear.

> **Warning:** *The DR4vr does not recognize the operational status and performance of an externally-connected DAT. Therefore, AKAI does not guarantee the quality of data backed up to external devices.*

Notes on DAT Backup Data Compatibility

You can load DR4d version 3.0 data from DAT to the DR4vr, and use the data with no problem.

Also, you can load data created on the DR4vr from the DAT to a DR4d version 3.0. However, there are some restrictions, as follows:

* If audio data you are loading is very large (636 or more segments), the load operation will be unsuccessful and will stop. An error message will appear.

* Only the first tempo map will be loaded. The second and third tempo maps will be ignored.

* The MIX ratio and PAN setting in Ping-pong mode will not be loaded.

* If you attempted to load data but some of the data failed to load, the data that was not loaded will be lost when you re-save the data from the DR4d to the DAT.

Backup via SCSI-B Bus

Installing an optional IB-111S SCSI Interface board allows you to save and load your audio data to and from an external MO drive or hard disk via the SCSI-B bus.

Since an external control protocol is supported, you can use waveform editing software on an external computer.

Connection & Setup

> **Warning:** *Make sure that the DR4vr and the external backup devices are powered off before making any connections. Do not connect or disconnect SCSI cables while a device is powered on.*

1) Use a SCSI cable to connect either of the two SCSI-B connectors on the IB-111S to the SCSI connector on the external backup device.
Use only high-quality SCSI cables with a maximum length of six meters.

2) Terminate the SCSI-B bus and set the SCSI ID numbers.
The illustration below shows how to set the termination and SCSI ID number on the DR4vr rear panel.

Refer to the instruction manuals supplied with the external backup device for details about setting its termination and SCSI ID number.

The first and last devices on the SCSI-B bus should be terminated. Assign an exclusive SCSI ID number to each device (0 to 7).

DR4vr rear panel SCSI-B switch
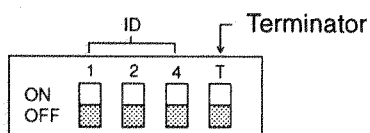
The initial DR4vr settings are:
Termination: OFF
ID number: 0

ID	1	2	4
0	OFF	OFF	OFF
1	ON	OFF	OFF
2	OFF	ON	OFF
3	ON	ON	OFF
4	OFF	OFF	ON
5	ON	OFF	ON
6	OFF	ON	ON
7	ON	ON	ON

3) Power up the external backup device, then the DR4vr. Do not power up the DR4vr first.

4) Format the external backup device.
Use 512byte/block or 1024byte/block.

If you're backing up to a hard disk, use one with a capacity greater than the hard disk used by the DR4vr for recording.

The following formula can be used to calculate approximate recording and backup capacities:

The space required for one minute of audio data at a sampling frequency of 48 kHz is:

$48000Hz \times 2$ bytes $\times 60$ seconds $= 5.76MB$

So a capacity of approximately 24MB is required for one minute of 4 channel back up.

Backing Up to an External MO or Hard Disk

We recommend that you format the external backup device (MO disk or hard disk) with the DR4vr even if it is brand new or has been formatted using a different device.

You can back up one unit of sound data on one 3.5 inch MO disk, one side of a double-sided MO disk, or one hard disk. A unit of sound data can be specified using the in/out points.

The following procedure describes how to back up:

1) **Press the SUB-MENU key, then press the BACKUP key to enter Backup mode.**

2) **Select 5ᴄ5ı -b using the jog wheel, then press the STORE/ENT key.**

3) **Select the SCSI ID number that corresponds to the external backup device.**

4) **Select Foᵣ ЧᴇS (Format–Yes) or Foᵣ no (Format–No) using the jog wheel, then press the STORE/ENT key.**
   This determines whether or not the backup device will be formatted before backup starts.

5) **Select ᴀʟʟ (all data) or ın--out (in–out data) using the jog wheel, then press the STORE/ENT key. The message 5Uᵣᴇ ?? will ask you for confirmation.**

   > *Note: You must specify the data for backup using the* IN/OUT keys *before* you select ın--out

6) **Press the STORE/ENT key to start the backup.**
   If you selected Foᵣ ЧᴇS at step 4, the external backup device will be formatted, then the data will be backed up.

   To cancel this setup procedure or a backup that is in progress, press the ESCAPE key.

   Depending on the capacity of the backup device and the amount of data to be backed up, the message bᴀFuʟʟ (BACKUP FULL) may appear, especially with 3.5 inch MO disks. In this case, insert a new MO disk and press the STORE/ENT key. Backup will continue. Number the disks sequentially. When loading data back into the DR4vr, disks must be inserted in the correct order.

   > *Note: While a backup is in progress, do not power off a device or attempt to eject an MO disk.*

7) **When the backup has finished, the message Fı nı 5H will appear.**

Loading Data from a Backup Device

The following procedure describes how to load (restore) data from a backup device:

1) **Press the SUB-MENU key, then press the LOAD key to enter Load mode.**

2) **Select 5ᴄ5ı -b using the jog wheel, and press the STORE/ENT key.**

3) **Select the SCSI ID number that corresponds to the external backup device, then press the STORE/ENT key.**

4) **The time display will show --------.**
   To load the data back to the same time position that it occupied when it was backed up, press the STORE/ENT key. The message 5Uᵣᴇ ?? will appear. Press the STORE/ENT key again to start the loading.

   To load the data to a different time position, enter a time using the numeric keypad, then press the STORE/ENT key. The message 5Uᵣᴇ ?? will appear. Press the STORE/ENT key again to start the loading.

   Pressing the ESCAPE key during either loading or setting operations will cancel the corresponding operation.

   If you make a mistake while entering a time, press the RESET key and -------- will appear, then re-enter the correct time.

   When loading data from a backup that is split across a number of MO disks, the message ı nSᴇᵣt will appear and loading will stop when the DR4vr requires you to insert the next disk. Insert the next disk and press the STORE/ENT key. If you inserted the correct disk, loading will continue.

   > *Note: While loading is in progress, do not power off a device or attempt to eject an MO disk.*

If the specified time position would cause the backup data to overlap any existing data, the existing data has priority and the backup data cannot be loaded. To replace existing data, erase it using the sub-menu Erase function.

5) When loading has finished, the message $FI \, nI \, 5H$ will appear.

> **Warning:** *The DR4vr does not recognize the operational status and performance of an externally-connected MO or computer. Therefore, AKAI does not guarantee the quality of data backed up to external devices.*

Notes on MO Backup Data Compatibility

You can load DR4d version 3.0 data from MO to the DR4vr, and use the data with no problem.

You cannot load data created on the DR4vr from the MO to the DR4d version 3.0.

12 MIDI Synchronization

In this chapter, we explain how to synchronize a MIDI sequencer to the DR4vr. The DR4vr is used as MIDI Clock master, and the MIDI sequencer is used as a MIDI Clock slave. The DR4vr cannot be used as a MIDI Clock slave.

IB-113M MIDI Interface Card

To use MIDI synchronization, you must install an optional IB-113M-V3.0 MIDI Interface card. Please contact your Akai professional dealer for details.

Installing an optional IB-113M-V3.0 on the DR4vr will allow the DR4vr to function as a clock master to synchronize the external MIDI devices such as a sequencer. You can also use the MMC &MTC software to control the DR4vr externally.

If you are using multiple DR4vrs or DR4ds for synchronization, be sure to install the IB-113M-V3.0 on the master device (ID=1). Installing this card on slave units will cause improper operation.

Connection & Setup

1) **Using MIDI cables, connect the MIDI OUT (MIDI IN) terminal of the IB-113M-V3.0 to the MIDI IN (MIDI OUT) terminal on the external MIDI device, respectively.**

2) **Press the SUB-MENU key, then press the SYNC key to enter Sync mode.**

3) **Select the type of Sync mode using the Jog wheel or Shuttle control.**
   If you select $n \tau E C$ using the older version of IB-113M, or if you select $L E C \ r d$, $L E C \ C E n$" without a SMPTE/EBU timecode interface board installed, "NO OPTION ($n o O P E \ IO_n$)" will appear.

Sync Mode	Display
REMOTE	$r E n \tau o E E$
SMPTE/EBU READ	$L E C \ r d$
SMPTE/EBU GENERATE	$L E C \ C E n$
MIDI clock	$n \tau \ Id \ I \ C L$
MIDI timecode	$n \tau E C$

4) **Press the STORE/ENT key to enter the MIDI device ID.**

5) **Select an ID number using the Jog wheel or Shuttle control.**

6) **Press the SYNC key to turn the selected sync ON.**

> *Note: If you set SYNC to any setting other than REMOTE and turn off the power, the SYNC will be automatically set to ON the next time you turn the power to the DR4vr. To cancel this synchronization, press the SYNC key once again. The SYNC LED will go off, and synchronization will be cancelled.*

Operation

When playback is started and stopped on the DR4vr, MIDI Start and Stop messages respectively will be sent to the sequencer, and it too will start and stop playback. The sequencer will be synchronized to the MIDI Timing Clock data being output by the DR4vr. These types of MIDI messages are called System Real-Time messages.

MIDI Sync Notes

• The MIDI sequencer is always synchronized according to the time displayed on the DR4vr. And, the tempo map and beat map always use 0001-01-00 as their initial start point. This applies to both absolute and relative time. Therefore, MIDI synchronization can be offset by using the DR4vr's relative time function.

- MIDI sequencers always treat songs as separate entities, and usually start song playback from the first beat of the first bar. However, the DR4vr treats individual songs (recorded on the same disk) as one continuous recording. Consequently, subsequent songs do not start at the first beat of the first bar. In this case, you must use relative time and set an offset to make the beginning of subsequent songs coincide with the first beat of the first bar on the sequencer.

- When controlling a MIDI sequencer with MIDI sync, setting a negative offset will disable sequencer playback. As an alternative, insert a blank bar at the top of the sequencer song. This will produce the same result as setting a negative offset on the DR4vr.

- If the IB-113M MIDI Interface card has not been installed, and you select MIDI sync, then press the STORE/ENT key, the message *noOPt IOn* will appear.

MIDI Timecode Synchronization

Pressing the PLAY key (or REC and PLAY keys) on the DR4vr will output a MIDI timecode signal corresponding to the specified SMPTE/EBU timecode type from the MIDI OUT terminal during playback (or recording).

MIDI Clock Synchronization

Pressing the PLAY key (or REC and PLAY keys) on the DR4vr will output a MIDI clock signal corresponding to the programmed Tempo Map from the MIDI OUT terminal during playback (or recording).

Although the Cue/Review, <<PLAY>>, REPEAT, PLAY TO OUT, JOG/SHUTTLE, and VARI functions of the DR4vr work during sync operation, the MIDI timecode and MIDI clock commands are not issued. Therefore, the connected external devices are stopped during those operations.

It should be noted that operating the PLAY and STOP keys (PLAY→ STOP→ PLAY) very quickly (within one second) on the DR4vr during the MIDI clock synchronization may cause the playback sound from an external MIDI device to slip.

About MMC (MIDI Machine Control)

MIDI Exclusive Command and MIDI Machine Control of the DR4vr conform to the MIDI Machine Control RP (Recommended Practice) Version 1.00. This allows you to control the DR4vr with the MMC protocol by connecting the external controller and the DR4vr using the MIDI interface board (IB-113M-V3.0).

- Setting a device ID number only on the DR4vr will allow the use of MMC. No mode settings are required. MMC commands can be sent to the DR4vr at anytime.
  Match the MIDI device ID setting to that of the external controller. If the external controller does not have an ID setting, any ID number on the DR4vr can be set.

- The following third parties are now preparing various software products. Please refer to their manuals for operational information.

MARK OF THE UNICORN® DIGITAL PERFORMER® will be available to support MMC & MTC and provide sample editing capabilities for use with the DR4vr.

EMAGIC® LOGIC™ sequencing and notation software is available for MMC & MTC use with the DR4vr.

STEINBERG® CUEBASE™ is available for MMC & MTC use with the DR4vr.

Tempo Map & Beat Map

Tempo Map

The MIDI Timing Clock data output by the DR4vr will control the tempo of the sequencer. Therefore, you must first create a tempo map on the DR4vr, so that the sequencer plays at the correct tempo. You can set up to three tempo maps. If a song's tempo remains the same throughout, the tempo map will have only one entry. That entry will be at the beginning of the song and will specify the song's tempo. If the song contains any tempo changes, these changes will have to be entered into the tempo map.

Initially, the first entry in the tempo map is set to 120 bpm.

Tempo map entries are displayed in the following format: *00 1- 1200* This means that the tempo setting is 120.0 bpm starting at entry 001 (initial setting). When the next entry is added to the tempo map, it will be displayed as *002- 1500* . In this case the tempo has been changed to 150.0 at entry 002.

Before creating a tempo or beat map, it's a good idea to jot them down on paper first. This way you'll also have a hard copy for quick reference. The following tables show how you could layout a beat map and tempo map.

Beat Map

As well as setting the tempo, you must also specify the song's beat (time signature). Just like tempo, if a song's beat remains the same throughout, you only have to specify it once at the beginning of the song. However, if the beat of the song changes, these changes will have to be entered into the beat map.

Initially, the first entry in the beat map is set to 4/4.

Beat map entries are displayed in the following format: *0 1-04-04* This means that the beat setting is 4/4 starting at entry 01 (initial entry). When the next entry is added to the beat map, it will be displayed as *02-03-04* . In this case the beat has been changed to 3/4 at entry 02.

Example Tempo Map

Entry No.	Tempo	Bar No.
001 (initial)	120	0
002	122	9
003	120	17
004		
005		

Example Beat Map

Entry No.	Beat	Bar No.
01 (initial)	4/4	0
02	3/4	9
03	4/4	17
04		
05		

Changing the Initial Tempo & Beat settings

If your song does not contain any tempo or beat changes, you only need to change the initial settings.

To Change the Initial Tempo Setting:

1) Press the TEMPO key.
If the tempo has not previously been changed, the initial setting will already be selected.

2) Press the rewind key to select the initial setting.
The initial setting *00 1- 1200* will appear on the display. By looking at the initial entry you can see that the tempo is set to 120.

3) Use the jog wheel, shuttle control, or number keypad to specify the new tempo.
The tempo can be set from 30 to 300 bpm.

The jog wheel adjusts the tempo in single beat steps, the shuttle control in tenths of a beat.

To specify the tempo using the number keypad, enter the value from left to right. For example, to enter the tempo 123.5, press these number keys in the following order: 1, 2, 3, 5.

4) Press the STORE/ENT key.
The new tempo setting will be stored.

5) Press the ESCAPE key to cancel the tempo function.

To Change the Initial Beat Setting:

1) Press the SUB-MENU key.

2) Press the BEAT key.
If the beat has not previously been changed, the initial setting will already be selected.

3) Press the rewind key to select the initial setting.
The initial setting *0 1-04-04* will appear on the display. By looking at the initial entry you can see that the beat is set to 4/4.

4) Use the jog wheel or shuttle control to specify the new beat.

5) Press the STORE/ENT key.
The new beat setting will be stored.

6) Press the ESCAPE key to cancel the beat function.

Creating a Tempo Map

You can create up to three tempo maps.

Selecting a Tempo Map

If you created two or three tempo maps, follow the procedure below to select one of them:

1) **Press the SUB-MENU key, then "9/UTILITY" key.**

2) **Use the jog wheel to select *tEn⁊Po* (TEMPO).**

3) **Press the STORE/ENT key.**

4) **Use the jog wheel to select a Tempo Map number.**

5) **Press the STORE/ENT key.**
   The Tempo Map will be switched.

Inserting Entries into the Tempo Map

1) **Press the TEMPO key.**
   If no entries have yet been made, *00 1- 1200* will appear on the display.

2) **While holding down the TEMPO key, use the shuttle control to specify the bar and the jog wheel to specify the clock position at which you want to insert an entry.**

3) **When you've specified the bar, release the TEMPO key.**
   The display will show *- - - - 1200*

4) **Use the jog wheel, shuttle control, or number keypad to specify the tempo.**

5) **Press the STORE/ENT key.**
   The new entry will be stored in the tempo map.

   To insert more entries, repeat steps 2 to 5.

   Use the rewind and fast forward keys to select entries in the tempo map.

6) **When you've finished, press the ESCAPE key to cancel the tempo function.**

Checking the Tempo Map

To check the current tempo:

1) **Press the TEMPO key.**
   The current tempo will be displayed.

2) **To find the entry that has specified the current tempo, press the rewind key.**

3) **To check the bar at which the entry occurs, press and hold down the TEMPO key.**

4) **Use the rewind and fast forward keys to select other entries.**

5) **When you've finished, press the ESCAPE key to cancel the tempo function.**

Deleting Entries from the Tempo Map

To delete an entry from the tempo map:

1) **Press the TEMPO key.**

2) **Use the rewind and fast forward keys to select the entry that you want to delete.**

3) **Press the REC key.**
   The entry will be deleted.

4) **When you've finished, press the ESCAPE key to cancel the tempo function.**
   The initial entry cannot be deleted.

Creating a Beat Map

Inserting Entries into the Beat Map

1) Press the SUB-MENU key.

2) Press the BEAT key.
If no entries have yet been made, $0 1-04-04$ will appear on the display.

3) While holding down the BEAT key, use the jog wheel or shuttle control to specify the bar at which you want to insert an entry.

4) When you've specified the bar, release the BEAT key.
The display will show $---04-04$

5) Use the jog wheel or shuttle control to specify the beat.

6) Press the STORE/ENT key.
The new entry will be stored in the beat map.

To insert more entries, repeat steps 2 to 5.

Use the rewind and fast forward keys to select entries in the beat map.

7) When you've finished, press the ESCAPE key to cancel the beat function.

Checking the Beat Map

To check the current beat:

1) Press the SUB-MENU key.

2) Press the BEAT key.
The current beat will be displayed.

3) To find the entry that has specified the current beat, press the rewind key.

4) To check the bar at which the entry occurs, press and hold down the BEAT key.

5) Use the rewind and fast forward keys to select other entries.

6) When you've finished, press the ESCAPE key to cancel the beat function.

Deleting Entries from the Beat Map

To delete an entry from the beat map:

1) Press the SUB-MENU key.

2) Press the BEAT key.

3) Use the rewind and fast forward keys to select the entry that you want to delete.

4) Press the REC key.
The entry will be deleted.

5) When you've finished, press the ESCAPE key to cancel the beat function.
The initial entry cannot be deleted.

13 SMPTE Synchronization

This chapter explains how to synchronize to and generate SMPTE/EBU timecode.

Installing an optional IB-112T-V3.0 SMPTE/EBU Timecode board allows you to record and play back data syncing to SMPTE/EBU timecode with an external device (VTR, MTR, etc.).

If you are using multiple DR4vrs or DR4ds for synchronization, be sure to install the IB-112T-V3.0 on the master device (ID = 1). Installing this board on slave units will cause improper operation.

Connection & Setup

1) **Using a SMPTE/EBU timecode signal cable, connect the SMPTE IN jack (or THRU jack for timecode signal output) of the IB-112T-V3.0 and the external device.**
   Depending on the external device supplying the timecode, you may need to use an adapter cable such as an XLR-type to stereo phone plug.

2) **Press the SUB-MENU key, then press the BBC DISPLAY key to enter Time Display mode.**

3) **Use the jog wheel or shuttle control to select a timecode type, then press the STORE/ENT key.**
   The following timecode types can be selected:

Timecode Type	Display
24 frames/sec	24 F
25 frames/sec	25 F
30 frames/sec	30 F
30 drop frames/sec	30 dF
29.97 non-drop frames/sec	29. 97F

4) **Press the SUB-MENU key and press the SYNC key to enter Sync mode.**

5) **Use the jog wheel or shuttle control to select the type of Sync mode. Press the STORE/ENT key.**
   If you select LtC GEn using an older version of IB-112T, or if you select nIdI CL or nntC without a MIDI interface board installed, NO OPTION (noOPt IOn) will appear.

Sync Mode	Display
REMOTE	rEnnotE
SMPTE/EBU READ	LtC rd
SMPTE/EBU GENERATE	LtC GEn
MIDI CLOCK	nIdI CL
MIDI TIMECODE	nntC

6) **Press the SYNC key to activate synchronization.**

> *Note: If you set SYNC to any setting other than REMOTE and turn off the power, the SYNC will automatically be set to ON the next time you turn on the power to the DR4vr. Therefore, if you are using the SMPTE read synchronization, your system will automatically be ready for the sync operation; you do not need to operate the DR4vr. To cancel this synchronization, press the SYNC key once again. The SYNC LED will go off, and synchronization will be cancelled.*

LTC Read Synchronization LtC rd

Press the DR4vr PLAY key to activate the DR4vr for sync playback. When the DR4vr receives a timecode, the message LtCUnLC (LTC UNLOCK) will appear for a few seconds, then synchronization will start. If a timecode is not received, the message -noLtC- (NO LTC) will

appear and the unit will remain in stop mode.

Press the DR4vr STOP key to stop playback.

The following table shows the status of the DR4vr during LtC rd sync.

DR4vr Status	Not Receiving Timecode	Receiving Timecode
STOP	$noL tC$	DR4vr current time displayed
PLAY	$noL tC$	SMPTE/EBU time displayed

Synchronization with an Offset

During LtC rd synchronization, the DR4vr synchronizes to the received timecode and the timecode value is displayed. Using the relative time display allows timecode-synchronized operation with an offset. When required, stop the DR4vr, then set an offset.

Punch In/Out & Slave Sync Playback

During LTC sync playback, you can punch in/out (auto and manual) and rehearse. This allows channel insertion from a master digital source.

If the timecode signal is interrupted during the LtC rd sync operation:

- Playback will stop when the timecode signal is interrupted, and start again when the signal comes in.
- Recording will stop (REC cancel) when the timecode signal is interrupted, and playback will start when the signal comes in again.

LTC Gen Synchronization LtC GEn

Pressing the PLAY key (or REC and PLAY keys) on the DR4vr will output the selected timecode signal from the SMPTE THRU terminal during playback (or recording).

Output level: 5Vp-p (balanced), 2.5Vp-p (unbalanced)

> **Note 1:** Although the Cue/Review, <<PLAY>>, REPEAT, PLAY TO OUT, JOG/SHUTTLE, and VARI functions of the DR4vr work during syncing to the SMPTE/EBU timecode, the timecode is not issued. Therefore, the connected external devices are stopped during this sync operation.
>
> **Note 2:** If the DR4vr receives a timecode that is different from the setting on the DR4vr, it will show an error message of TYPEoo, such as $tYPE30F$ or $tYPEdF$. However, the DR4vr cannot differentiate between 29.97F and 30F, thus displaying $tYPE30F$ in both cases.
>
> **Note 3:** If the SMPTE/EBU timecode sync operation continues over the absolute time 24:00 (midnight), the sound data will be interrupted momentarily.

14 Synchronizing to Other DR4vrs/DR4ds

In this chapter, we explain how to synchronize two, three, or four DR4vrs/DR4ds together, thus providing 8-, 12-, and 16- channel recording respectively. In this case, one DR4vr operates as master, and the other DR4vrs/DR4ds as slaves. It is not possible to transfer data between synchronized DR4vrs/DR4ds.
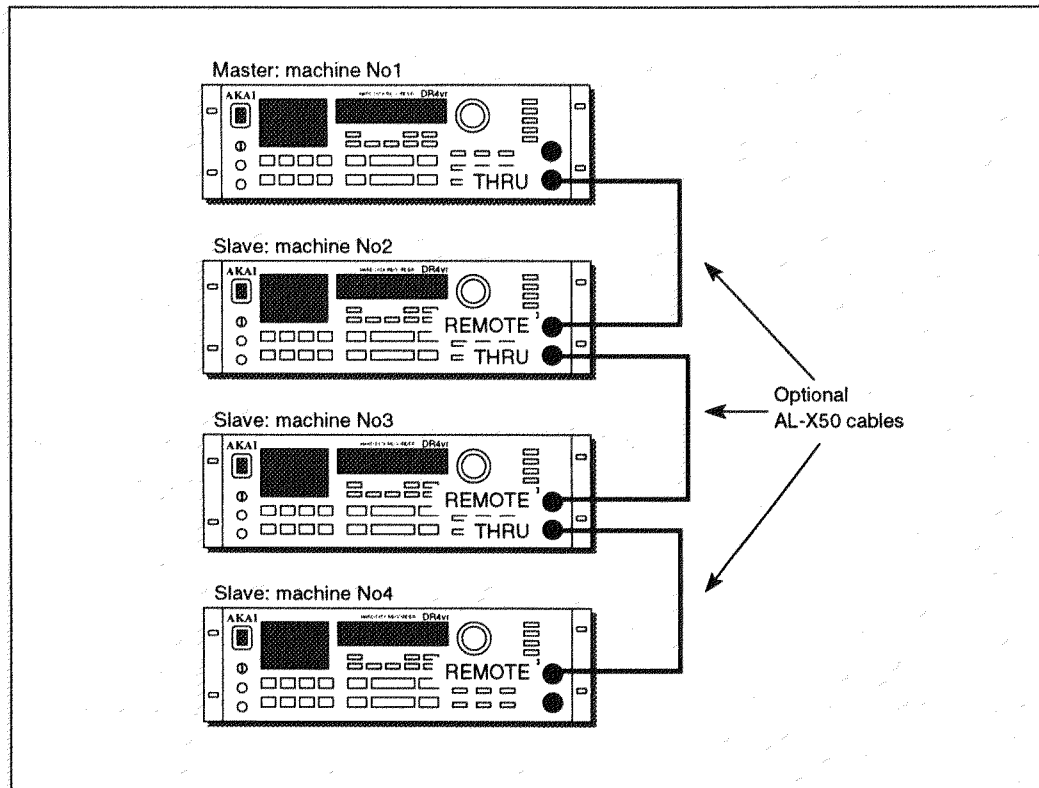
AL-X50 Remote Cable

You connect multiple DR4vrs together using optional Akai AL-X50 cables. These are available from your Akai professional dealer.

Note: Use only Akai AL-X50 cables for REMOTE and THRU connections.

Connection

The following diagram shows how the DR4vrs should be connected:

Setup

Set up each DR4vr using the following procedure:

1) Press the SUB-MENU key, then the SYNC key.

2) Use the jog wheel to select *rEⁿⁿotE* .

3) Press the STORE/ENT key.
The machine ID number will appear on the display.

4) Use the jog wheel to set the master DR4vr to machine ID 1. Set the first slave to ID 2, the second slave to ID 3, and the third slave to ID 4.

> *Note: Each DR4vr must have its own ID number; otherwise, it will not work correctly.*

Operation

1) Press the SYNC key on each slave DR4vr to activate external sync.
When playback is started on the master DR4vr, the slave DR4vrs follow the master. All locate and recording functions are controlled by the master. However, channel arming and auto monitor settings should be made on each DR4vr.

> *Note: Locate point values on the slave DR4vrs are ignored when synchronized to a master DR4vr.*

> *Note: If the SYNC has been set to "REMOTE" and you have turned off the power to the DR4vr, the SYNC will be ON in the following cases the next time you turn on the power:*
>
> *•When the REMOTE ID has been set to 0 and the DR4vr has been connected.*
>
> *•When the REMOTE ID has been set to anything other than 0, and a DR4vr with REMOTE ID 0 has been connected.*
>
> *To cancel this synchronization, press the SYNC button once. The SYNC LED will go off, and synchronization will be cancelled.*

REMOTE Sync with Other DR4vrs

In a multiple DR4vr system, you can control the following functions from a master DR4vr:

* Auto Punch in/out
* Playback between in/out points using the <<PLAY>> key
* Repeat function
* Playback using the PLAY TO OUT key
* In/out point setting with the IN/OUT keys
* Jog/Shuttle control
* Cue/Review functions
* RESET key
* ABS/REL key
* AUTO MONITOR key

A multiple DR4vr system also offers the following functions:

* BBC DISPLAY key

  Setting BBC mode on the master device (or on the DL4, if it is connected) will display the "BBC" screen on the slave device.
* Remote sync setting on the slave device

  When both master and slave are set to REMOTE, and the power is turned off and then on, the

slave device will be set to Remote Sync on. If a DL4 is connected, it too will be set to Sync on mode.

- Error messages (PLL UNLOCK, NO DIGITAL, etc.) of the slave device are shown on the master device (also on the DL4 if it is connected).

- The display on the DL4 changes according to the change of Channel REC keys 1-4 on the slave device.

- The display on the DL4 changes according to the change of Digital select on the slave device.

- The display on the DL4 changes according to the change of Solo select on the slave device.

While in REMOTE sync operation, you can perform the following functions on individual DR4vrs:
- Sub-menu settings
- RESET key
- ABS/REL key
- Channel REC keys 1-4
- INPUT SELECT keys 1/2, 3/4
- AUTO MONITOR key
- UNDO key
- Tempo Map/Beat Map setup

> *Note: REMOTE sync cannot be used when one of the DR4vrs is backing up, loading, or performing an edit.*

Remote Sync Notes

- Due to status differences between each DR4vr in a multiple system, performing a manual punch in/out may cause slave DR4vrs to slip in time.

- If the master DR4vr's hard disk becomes full, REC stop will be displayed and the whole system will stop.

- If a slave DR4vr's hard disk becomes full, but the master DR4vr and other slave DR4vrs still have some hard disk space free, that slave will stop recording and display the message REC stop. The master DR4vr and other DR4vrs will continue recording.

- You can use the DR4d version 3.0 as master. In this case, functions available for synchronization will be those of DR4d version 3.0. If you wish to use the new functions on the DR4vr temporarily, turn the sync operation off to operate the DR4vr directly. If you try to use the DR4vr as master in this case, using the new functions of the DR4vr may cause malfunction.

Synchronizing MIDI devices to a Multiple DR4vr System

Installing an optional IB-113M-V3.0 MIDI interface board in the master DR4vr allows you to synchronize MIDI devices to a multiple DR4vr system during the Remote sync operation.

1) Set Sync on the master and slave DR4vrs to *rEnnotE* .

2) Set the master DR4vr ID number to 1 and the slave DR4vr ID numbers to 2, 3, and 4.

3) On the master DR4vr, press the SUB-MENU key, then press the SYNC key to enter Sync Set mode.

4) On the master DR4vr, use the jog wheel to select *nn Id I CL* or *nntC* .

5) Press the STORE/ENT key to enter MIDI Device ID mode, and use the jog wheel to select an ID number.

6) On the master DR4vr, press the SYNC key.

The slave DR4vrs will follow the master DR4vr, and the connected MIDI device will synchronize.

> *Note: MIDI devices cannot be synchronized (MIDI clock) when the DR4vr goes out of the range allowed by the MIDI Song Position Pointers. In this case, the SYNC LED will flash.*

Synchronizing a Multiple DR4vr System to External Timecode

Installing an optional IB-112T-V3.0 SMPTE/EBU Timecode board in the master DR4vr allows you to synchronize a multiple DR4vr system to the SMPTE/EBU timecode.

Follow steps 1, 2, and 3 described above, then use the jog wheel on the master DR4vr to select *LtC rd* or *LtC GEn*, press the STORE/ENT key, then the SYNC key.

Pressing the PLAY key on the master DR4vr will activate the system so that it is ready to start synchronized operation when a timecode signal is received when *LtC rd* is selected.

Pressing the PLAY key (or REC and PLAY keys) on the master DR4vr will output the selected timecode while playing back (or recording) data, causing the external devices to synchronize when *LtC GEn* is selected.

Controlling Multiple DR4vrs using the DL4 Remote Control

Using a DL4 Remote Control, you can control MIDI synchronization, SMPTE/EBU timecode synchronized playback, and up to 16-channel recording on multiple DR4vrs. Please refer to the DL4 operating manual for full details.

15 Other Functions

Emphasis

The emphasis function can be used to de-emphasize digital audio recorded on the DR4vr before it is output. The DR4vr cannot emphasize incoming signals.

If you are using analog inputs and outputs only, you do not have to worry about emphasis, because all digital devices de-emphasize their digital audio before outputting it via their analog outputs. The only situation where it should be considered is when you record an emphasized digital signal to the DR4vr via its digital inputs. In this case, the emphasis function should be turned on, so that the audio is de-emphasized before being output. If it is not, you will notice a slight boosting of frequencies above 3.5 kHz.

Emphasis can be switched on and off independently for channels 1/2 and 3/4.

Turning on Emphasis

1) Press the SUB-MENU key.
Its indicator will flash.

2) Press the EMPHA key.
Its indicator will light up, and the current emphasis setting will appear on the display.

3) Use the jog wheel or shuttle control to select an option.
The following table shows the four options:

Option	Meaning
l2oF34oF	1/2 off, 3/4 off
l2on34oF	1/2 on, 3/4 off
l2oF34on	1/2 off, 3/4 on
l2on34on	1/2 on, 3/4 on

4) Press the STORE/ENT key.
The new emphasis setting will be entered.

What is Emphasis?

Emphasis is a technique that was used to improve the performance of the first generation of A/D and D/A converters: a bit like noise reduction for digital systems. Converters have improved considerably over the past few years, so emphasis is no longer used. It has been included on the DR4vr for situations where emphasized digital audio from old digital master tapes, CDs, etc., is being recorded.

> *Note: If a channel contains both emphasized and unemphasized data, it cannot be played correctly.*

SCMS

Pronounced "scums", SCMS (Serial Copy Management System) is a protection system designed to stop multiple digital copying of copyrighted material. SCMS applies to all CD players and consumer type DAT, MD, and DCC recorders. Basically, it prevents second-generation digital copies from being made. It has no effect when analog connections are used.

When the DR4vr receives a digital signal that contains SCMS, it will not prevent the DR4vr from recording. The digital signal will be recorded without the SCMS.

> **Note:** *If you are recording copyrighted material from a CD, DAT, MD, DCC, etc., you must have approval before you use it. It is permissible to use copyright-free material. Akai cannot accept any responsibility for breach of copyright law.*

Appendix

Initial Settings

The following table shows how various **functions** are set when the DR4vr is powered on, or when a hard disk is formatted.

Function	Setting
Status	Stop
Channel REC keys	All off
Rehearsal	Off
Varipitch	Off
ABS/REL	ABS
Auto monitor	Off
Input select 1/2	Analog
Input select 3/4	Analog
Preroll	Off
Repeat	Off
Auto punch	Off
Last memory	00:00:00:00

The following table shows how various **parameters** are set when a hard disk is formatted. These settings are remembered when the DR4vr is powered off.

Parameter		Setting
Relative time reference		00:00:00:00
Sub menu parameters	Preroll time	3 seconds
	Play to out time	3 seconds
	Sampling frequency	44.1 kHz
	Sync	Remote *
	Emphasis	All channels off
	Time display	30 frame
	Varipitch amount	–53
	Digital input	RCA
	Digital output	TYPE II
	Remote ID	ID #1 *
	Beat	Only 4/4 at 001.01.00
	Backup	digital
	Load	digital
	MIDI device ID	ID #00
	HD type	Abort OFF *
Tempo map		Only 120.0 at 001.01.00
Direct locate points		All 00:00:00:00
Stack memories		All 00:00:00:00
In point		00:00:00:00
Out point		00:00:00:00

Note: If the items marked with an asterisk "*" were changed when the hard disk was reformatted, they will not return to the default settings.

Troubleshooting

If your DR4vr does not seem to operating as it should, see if the symptoms are listed below:

| Symptom	What To Do
The DR4vr cannot be powered on.	Make sure that the power cable is connected to a suitable AC receptacle.
	Make sure that the DR4vr's POWER switch is in the ON position.
	If the DR4vr still cannot be powered up, contact your Akai professional dealer.

Display Messages

Messages	Summary	What to Do
no dI C IA	No digital signal is present at digital input A/B.	Is the digital signal being output by the sending device correctly?
no dI C Ib		Is the sub-menu D IN function set correctly?
noOPt IOn	Optional card is not installed.	Install option card.
FSooPS	The digital signal being input is at a different sampling frequency to that set on the DR4vr.	Check the sampling frequency setting in the FS sub-menu function.
		Check the sampling frequency of the device sending the digital signal.
bUSY	Indicates that the DR4vr is busy.	Some editing functions do take a little time.
PLL UnLC	Phase locked loop unlocked: the DR4vr cannot synchronize to an external digital signal or SMPTE timecode due to that signal being out of the DR4vr's sync range.	Make sure that the external signal is within the DR4vr's sync range.
CAUtI on	The hard disk access time may not be adequate. Also, recording may not be carried out correctly.	Align the hard disk. See "Data Alignment" on page 76. If the problem remains, the hard disk access time may not be adequate.
OvEr	The hard disk cannot access the data fast enough.	The hard disk access time may not be adequate.
ooPS 50	Repeat interval too short.	Specified interval is too short. See "Specifying the In Point & Out Point" on page 20.
ooPS 5I	Playback interval too short.	
ooPS 52	Record interval too short.	
ooPS 53	Edit interval too short.	
ooPS 54	Stop due to PLL unlock.	The DR4vr cannot synchronize to an external digital signal or SMPTE timecode due to that signal being out of the DR4vr's sync range.
ooPS 55	Insufficient disk space to perform edit.	Free up some disk space by erasing some unnecessary material.
ooPS 56	The result of this edit would produce data that exceeds the DR4vr's 24 hour limit.	The DR4vr cannot work with data that exceeds 24 hours.
ooPS 57	Audio management table is full.	Align the hard disk. See "Data Alignment" on page 76.
ooPS 58	There is no data to backup.	
ooPS 59	Insufficient disk space to perform load.	Erase some unnecessary material. Or, add some extra hard disk space.
ooPS 60	You have tried to load more data than the DR4vr can accommodate. Sound File Table is full (too many segmented recordings).	Erase some unnecessary data from the DR4vr hard disk or copy some segmented recordings as one continuous recording.
ooPS 6I	The data that you are trying to load overlaps the data already on the hard disk.	Erase the existing data.
ooPS 62	Cannot backup data because the in point and out point are the same.	Set the in point and out point using the IN and OUT keys.
ooPS 63	Data loaded from the DAT contains damaged audio data or drop outs.	Load the data again. If the problem recurs, the DAT tape may be faulty.

Messages	Summary	What to Do
ooPS 64	The audio data that you are trying to load will exceed the absolute time limit of 24 hours (midnight). For example, trying to load a segment of audio data 30 minutes long at a start time of 23:50 will exceed the limit.	Set a new start time such that the audio data will not exceed the absolute time limit.
ooPS 65	You have tried to record or playback data that exceeds the absolute time limit of 24 hours (midnight).	The DR4vr cannot process data that exceeds the absolute time limit of 24 hours (midnight).
ooPS 66	Auto punch in/out is not available.	Make sure that you start playback slightly before the punch in point, not after it.
		Make sure that the hard disk isn't full. If it is, erase some unnecessary data.
		Make sure that the interval between the in point and out point is not less than 1024 samples. If it is, change the in and out points.
ooPS 68	The audio data that you are trying to load is split across a number of MO disks, and you are not loading them in the correct order.	Insert the MO disks in the correct order
ooPS 69	While in Solo mode, you pressed the REC key or AUTO/MANUAL PUNCH key.	Cancel Solo mode before trying to set the punch in/out mode (auto/manual) or start recording.
ooPS 70	HD was formatted with Version 2.0 or a previous version, and the user data cannot be read.	Carry out the ERASE or FORMAT operation using the current version.
ooPS 71	HD was formatted with Version 2.0 or a previous version, and the user data cannot be written.	Carry out the ERASE or FORMAT operation using the current version.
ooPS 72	Overflow occurred during mixdown in . Ping-pong mode. The audio is clipped.	Audio limiter has been applied If the playback sound is defective change the MIX RATIO and try mixdown again

Error Messages

There are three types of error messages:

E00. E00-00. E00-0000
                            Error Code
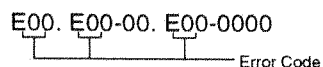
If an error message similar to one of the above appears, note the code number, and check the following remedies. If that does not correct the problem, or the error message appears frequently, please contact your Akai professional dealer.

1 ~ 13	Hard disk read/write error	Press the ESCAPE key to clear the error message, and back up all the data. Then, reformat the hard disk, and reload your data.
14, 15	Hard disk added or replaced	Erase the hard disk.

If an error message other than one of those listed above appears, please note the code number and the condition of the DR4vr just prior to the appearance of the error message, and contact your Akai Professional dealer.

Specifications

Digital Audio Format		16-bit linear PCM
Number of Channels		4 channels (expandable to 16 using four DR4vr/DR4ds)
A/D Conversion		18-bit 64-times oversampling 5th $\Delta\Sigma$ modulation
D/A Conversion		Advanced 1 bit, 18-bit 8-times oversampling
Sampling Rates		32 kHz
		44.1 kHz
		48 kHz
Audio Frequency Response		30 ~ 22 kHz ±1.0 dB (fs @ 48 kHz)
Dynamic Range		Greater than 96 dB (EIAJ)
Distortion		Less than 0.05% (1 kHz, full scale −15 dB)
Channel Crosstalk		Greater than 90 dB (1 kHz, fs @ 48 kHz)
Wow & Flutter		Immeasurable
Recording Media		Optional Internal hard disk or external hard disk
Recording Time	fs @ 48 kHz	4 ch = 23 min, 25 sec. 1 ch = 93 min, 42 sec
With optional 540MB	fs @ 44.1 kHz	4 ch = 25 min, 30 sec. 1 ch = 101 min, 59 sec
hard disk	fs @ 32 kHz	4 ch = 35 min, 08 sec. 1 ch = 140 min, 33 sec
Timecode Frame Rates		24, 25, 29.97, 30, 30D
Display		Eight 7-segment LEDs
Peak Level Meter		Four 20-segment LED bars
Locator		8 direct locate points
		100 stack locate points
Analog Inputs x4	Nominal	+4 dBu/−10 dBV (balance/unbalance)
	Max. Input	+19 dBu/+5 dBV (balance/unbalance)
	Impedance	94 kΩ /47 kΩ (balance/unbalance)
	Connector	6.3 Ømm stereo phone jack
Analog Outputs x4	Nominal	+4 dBu/−10 dBV (balance/unbalance)
	Max. Input	+19 dBu/+5 dBV (balance/unbalance)
	Impedance	200Ω/100Ω (balance/unbalance)
	Connector	6.3 Ømm stereo phone jack
Digital I/O-A	IN	1 x XLB-3-31
		1 x RCA/phono
(EIAJ CP-1201)	OUT	1 x XLB-3-32
		1 x RCA/phono
SCSI–A (for external hard disk)		1 x 50 pin Amphenol
PHONES x1		6.3 Ømm stereo phone jack
FOOT SW x1		6.3 Ømm phone jack
REMOTE & THRU		8-pin DIN (for connection to other DR4s)
Extension Slots x4		SCSI-B (IN/THRU), SMPTE, MIDI, Digital I/O-B
Supplied Accessories		Power cable
		Owner's Manual
Power Requirements	U.S.A. & Canada	120 V AC, 60 Hz
	Europe (not U.K.)	220 – 230 V AC, 50 Hz
	U.K. & Australia	240 V AC, 50 Hz
Power Consumption		48 W (U.S.A. & Canadian model)
Operating Temperature		5°C ~ 40°C (40°F ~ 105°F)
Operating Humidity		30% ~ 80% (no condensation)
Dimensions (W x H x D)		483 x 132.6 x 410 (425 overall) mm (19 x 5.2 x 16.1 inch) EIA 3U
Weight		9.5 kg (21 lb)
Options		DL4 Remote Controller
		HD540 540MB hard disk
		IB-110D Digital I/O-B (digital I/O for channels 3 & 4)
		IB-111S SCSI-B interface
		IB-112T SMPTE/EBU Reader/Generator
		IB-113M MIDI Interface
		AL-X50 DR4vr remote connection cable

0 dBu referenced to 0.775 Vrms 0dBV referenced to 1Vrms

Specifications subject to change without prior notice.

MIDI Implementation Chart

Date: 8/95
Version: 4.00

Function		Transmitted	Recognized	Remarks
Basic Channel	Default	X	X	
	Changed	X	X	
Mode	Default	X		
	Messages	X	X	
	Altered	**************	X	
Note Number:		X		
	True Voice	**************	X	
Velocity	Note On	X	X	
	Note Off	X	X	
After touch	Keys	X	X	
	Chs	X	X	
Pitch bend		X	X	
Control Change		X	X	
		X	X	
Program Change		X		
	True#	**************	X	
System Exclusive		O (*1)	O (*3)	MTC, MMC (*4)
System Common	:Song position	O	X	
	:Song Select	X	X	(*4)
	:Tune	X	X	
System Real Time	Clock	O (*2)	X	
	Start	X	X	
	Continue	O (*2)	X	(*4)
	Stop	O (*2)	X	
Aux Messages	: Local On/Off	X	X	
	: All Notes Off	X	X	
	: Active Sense	X	X	
	: Reset	X	X	

Notes
(*1) MTC is transmitted only when SYNC is ON in MTC mode.
(*2) These are transmitted only when SYNC is ON in MIDI clock mode.
(*3) Supporting MMC, system exclusive.
(*4) When IB-113M-V3.0 MIDI Interface is installed.

Mode 1:OMNI ON, POLY	Mode 2:OMNI ON, MONO	O: Yes
Mode 3:OMNI OFF, POLY	Mode 4:OMNI OFF, MONO	X: No